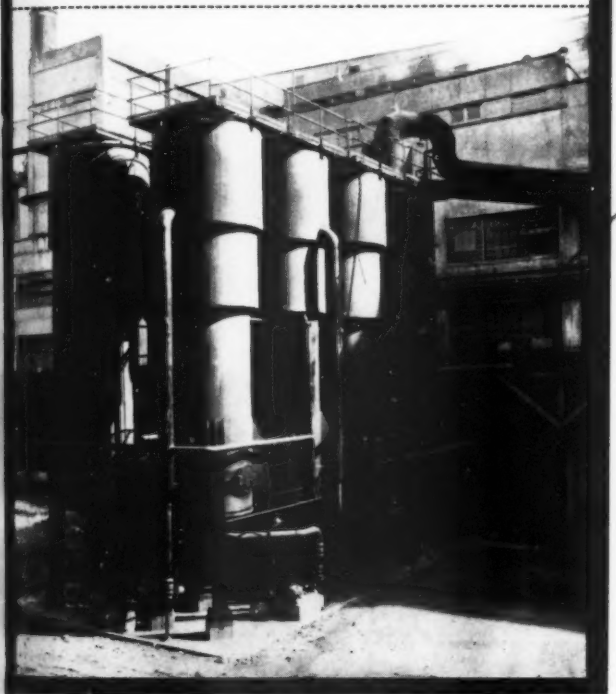
- Bleached kraft pulp made continuously at Hinton, Alberta
- New developments in digester blow valves
- Debarking chemicals
- Trends in packaging

The Paper Industry

87 OF AMERICA'S "FIRST HUNDRED" CORPORATIONS ARE WHITING CUSTOMERS



Crown Zellerbach Reduces Operating Costs with Swenson Evaporator System

Crown Zellerbach answers the need for greater operating economy with this modern septuple-effect system at their Camas, Washington, kraft pulp mill. It evaporates more water per pound of steam than the former unit and gives dependable, trouble-free service. This installation—like 90% of all such septuple-effect recovery systems—is Swenson-designed.

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"An Open Door" shows how efficient Swenson equipment opens the door to lower production costs. Write today. Swenson Evaporator Company, 13653 Lathrop Avenue, Harvey Illinois.

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Since 1889

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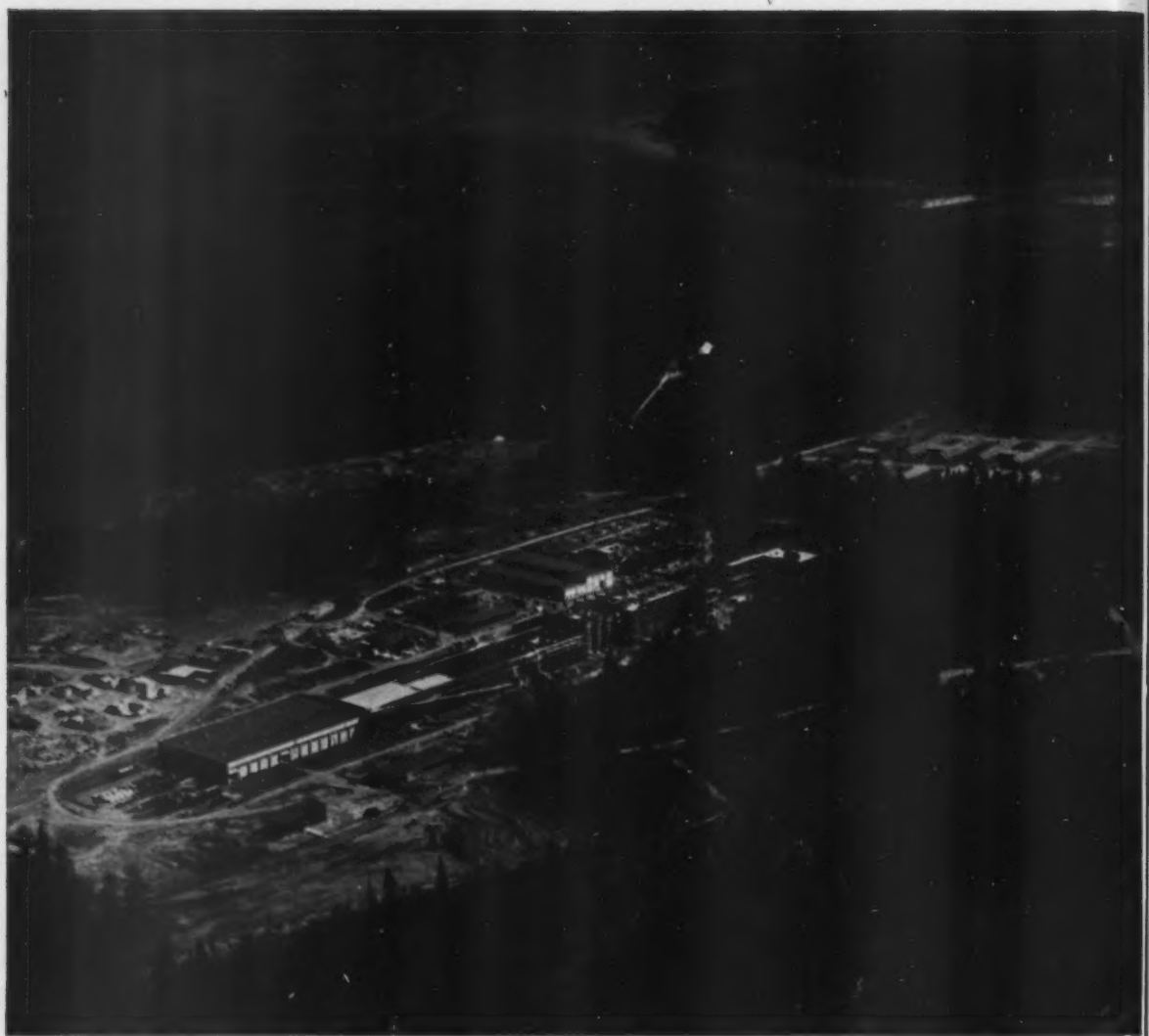

Crofton mill under construction to bring you a new, uniform pulp...

CROFTON KRAFT

A brand new, more uniform bleached Kraft market pulp comes another giant step closer. The big $38,000,000, 425-ton/day pulp mill of British Columbia Forest Products Limited, is now being built at Crofton, British Columbia, on the southeast coast of Vancouver Island.

This huge plant will produce a pulp of outstandingly uniform quality and workability and of brightnesses suitable for fine papers. This pulp will be made mainly from sawmill chips, small wood and logs.

Here are a few interesting facts about this ultra-modern pulp mill: Every day, 35 million gallons of filtered water will be used. The Kraft mill will be equipped with seven 6,100 cubic foot digesters. The pulp will be bleached in a six-stage system to brightnesses of 88-90. The Minton Vacuum Dryer, with 68 drums, will be capable of drying to 100% air-dry. The machine wet-end will be a 178" fourdrinier.

Mead Pulp Sales, Inc. has been named exclusive distributor for Crofton Kraft. When the pulp is marketed late this year, it will enable Mead to offer all essential grades of pulp to the industry. Plan now to take advantage of this new pulp supply. Further information about new Crofton Kraft, the mill, or existing Mead marketed pulps is available on request.

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Distributors of Wood Pulp
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This *original* PVC has set remarkable service records for the past 20 years—and is now available in the United States for the first time—only from Ryerson.

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Available Shapes—You can get quick shipment of Ryertex-Omicron PVC from Ryerson stocks in sheets, rods, pipe, valves and fittings in a wide range of sizes. Sheets up to ⅜" thick are fully extruded (not laminated).

Answers to your Questions in New Bulletin—Our bulletin 80-3 tells all about this amazingly versatile material and its applications. Write for your copy today and call your nearby Ryerson plant for any PVC requirement.

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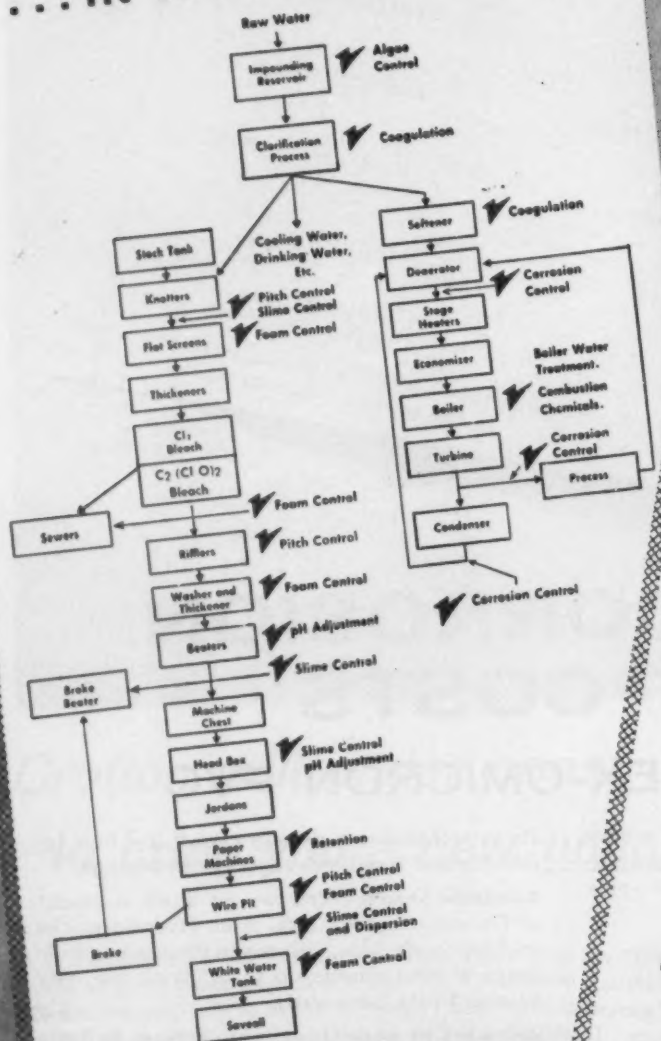

NALCO has the *widest variety* of formulas to assure results in your mill, too. Here are some examples . . . representative Nalco products listed under headings which indicate the job they do. And the chart at left tells you where they are used. Your Nalco Representative will tell you more about them — or write direct to Nalco.

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COAGULATION
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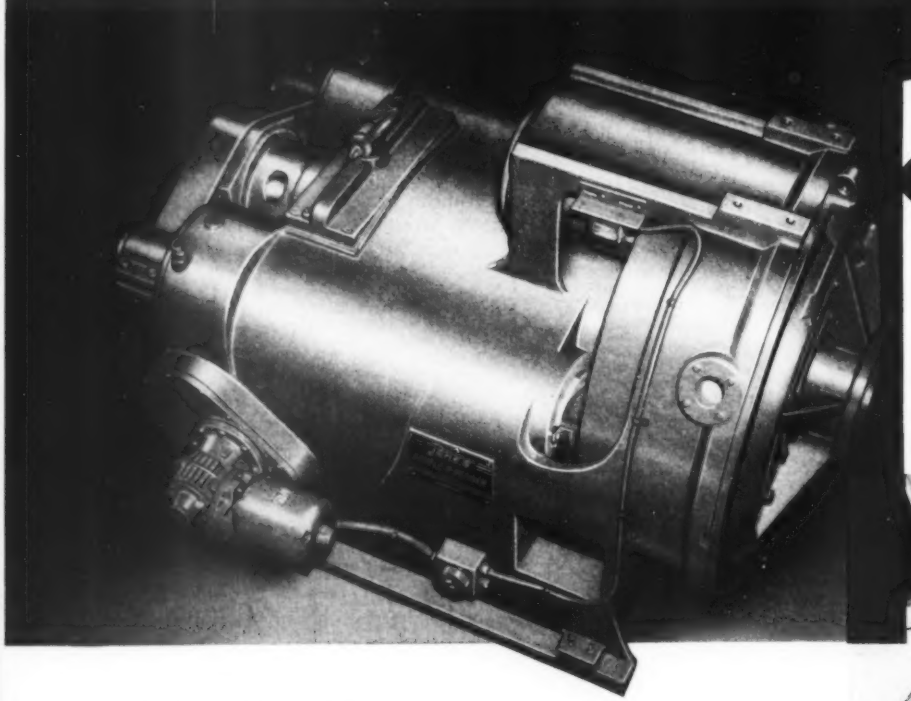
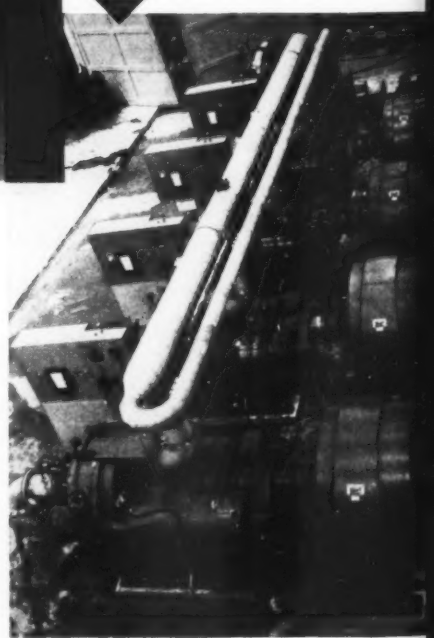
E.D. Jones DOUBLE-D WITH DOUBLE EQUA-FLO EFFECT



The clean, sturdy compactness of the Double-D requires a minimum of floor-space: it can be located almost anywhere.

Four 42" Double-D's in line serve the big new Kraft machine at International Paper's Mobile, Ala., plant. Note simplicity of piping — no special fluming or flow-boxes needed.



Not only does the amazing Jones Double-D refiner do twice the work of conventional refiners — not only does it provide two stages of refining in one pass through the machine — not only can it, if need be, defiber in the first stage and thoroughly refine in the second — but mills where it has been tried and proved for over two years report that it produces stock of equal or better quality than similar machines, even on hard-to-work stock.

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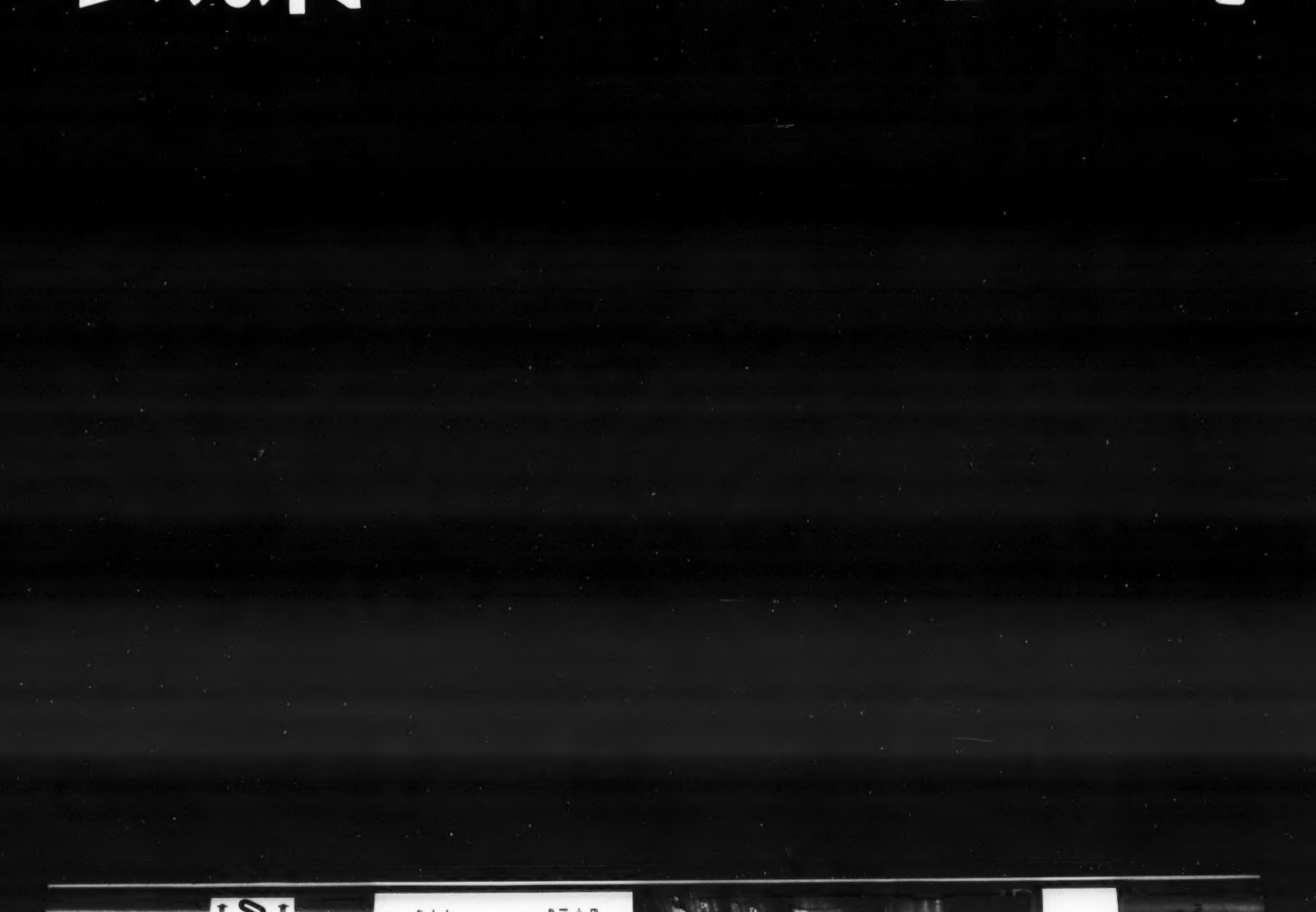


From our point of view . .

The effect of packaging at the point of purchase

The completion in this issue of the article on the impact of packaging on the paper industry by J. B. Calkin and J. L. Parsons invites a few comments on the psychology of packaging.

Packaging today is designed to play, to an ever increasing degree, the role of a salesman and even replace him completely at the point of purchase. This is dictated by modern supermarket merchandising and has the effect of maintaining the personal contact between manufacturer and consumer solely through the personality incorporated in the package. At the point of purchase the package is on its own. It has to come alive, reach out to the customer and deliver a favorable impact that will attract, stimulate and hold the interest of the customer to the point of completing the purchase.

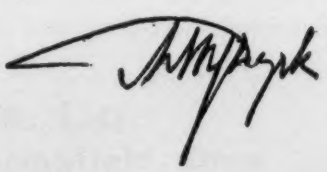
Imparting a personality to the package—designed to dramatically modify and augment, but not supplant, the personality of the product—has the advantage of achieving a better control of the psychological climate between the consumer and the product. The package, if properly designed, cannot impair the close and personal relationship between consumer and product, as is sometimes the case if the retail salesman's state of mind causes him to be unfriendly or discourteous.

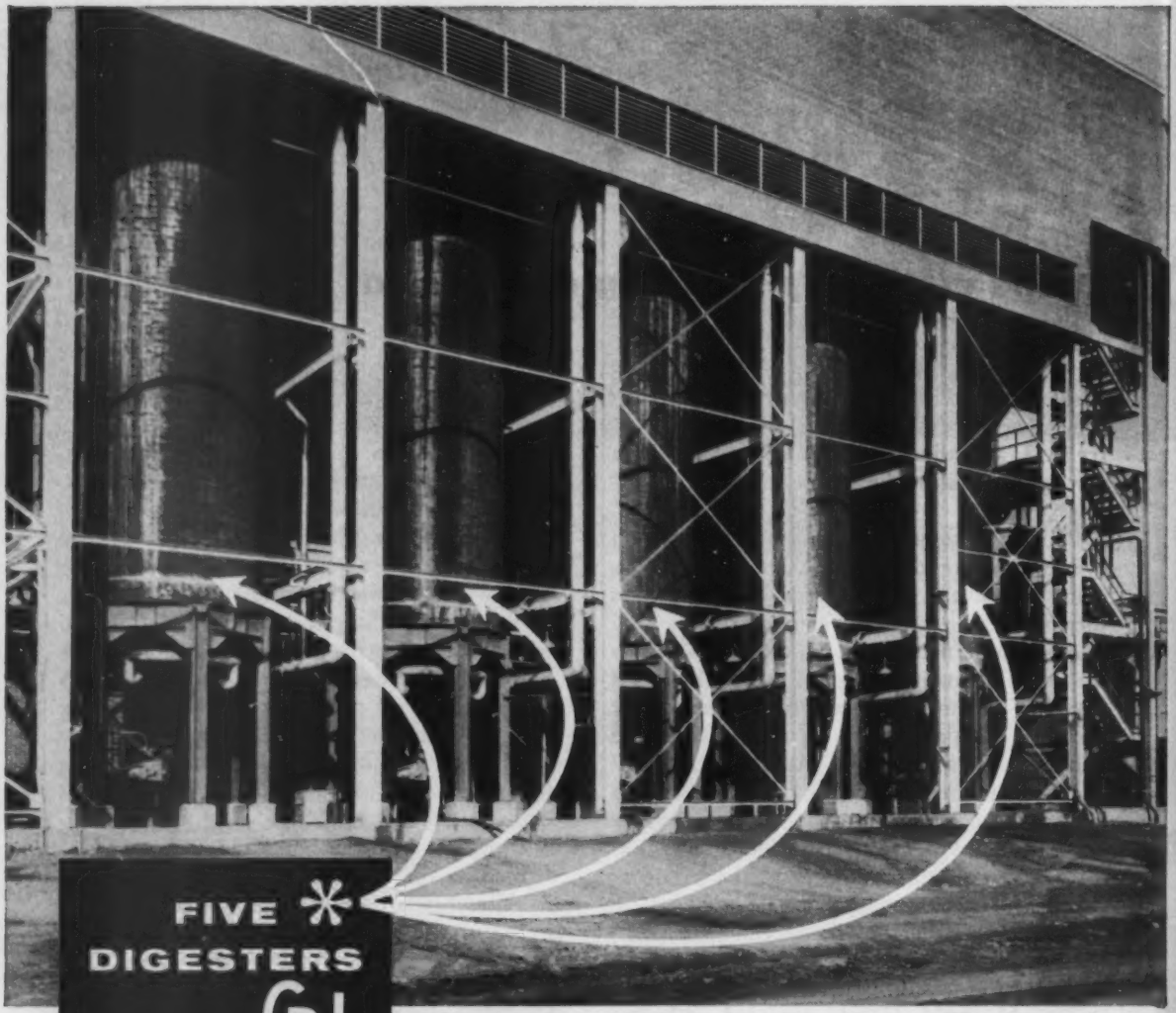
In order to deliver the desired impact, the package must exert a sufficient amount of "design tension", according to Dr. Ernest Dichter in "The Man in the Package" (available from the Paraffined Carton Research Council). To effect the sale, package designers strive for an optimum balance in design tension. Too much emphasis on design, however, does not produce the desired result, for it causes the personality of the package to dominate at the expense of the product.

A successful package design reflects a unity of purpose of the package and the product. There should be no clash or contradiction in personality between package and product. A contradiction of purpose or personality here can only arouse suspicion and antagonism toward the product, often giving rise to a feeling that the manufacturer is careless or is deliberately trying to cover up for certain inadequacies in product quality.

Finally, the package must have the ability to rejuvenate the product periodically. This is a task that requires all the ingenuity of the package designer. A package that has been in use for many years may convey the impression that the product is antiquated, that—in this age of speed and rapid change—there should be something better available on the market.

The manufacturing industry has always been very particular and methodical about the selection of its sales force. It is becoming increasingly important that the same care and attention must be paid to the proper design and selection of the package—which is rapidly assuming the identity of a new and potent salesman.





. . . help handle over 400 tons of unbleached sulphate daily for southern mill

Six digesters, five of which were built by CB&I of A-285 Grade "B" fire box steel, handle over 400 tons of unbleached sulphate daily at the Bowaters Southern Paper Corporation's $60 million newsprint and sulphate mills at Calhoun, Tenn. Each digester has a shell thickness of two inches and weighs approximately sixty-two tons.

CB&I's facilities for designing, fabricating and erecting steel plate structures are complete . . . including equipment at all four plants for stress relieving, X-raying and pickling and painting. When you plan steel plate structures, write your nearest CB&I office for information, estimates or quotations.

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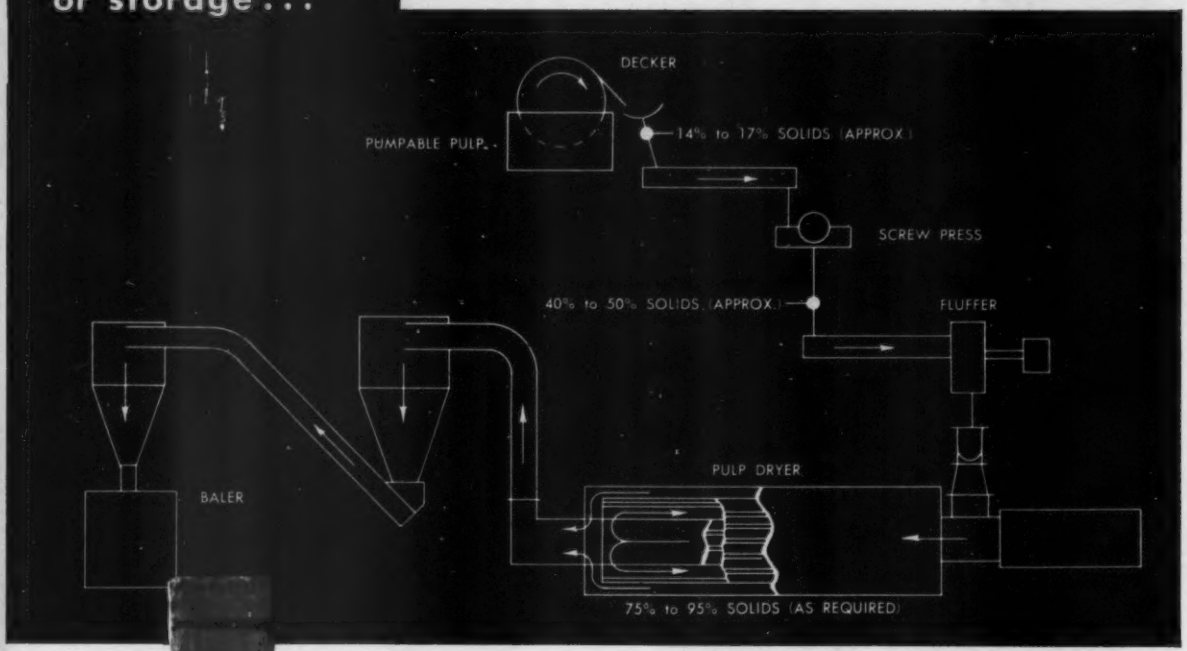
The NEW way to prepare pulp for shipment or storage . . .



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This is the modern, economical method of drying and baling pulp for shipment developed by The Bauer Bros. Co.

Automatically controlled, the system removes up to 95% of the pulp's moisture content, greatly reducing freight costs. It produces high density bales which are easy to handle, simple to store and ship. The pulp resists deterioration, retains strength and brightness. It repulps easily, requiring less than five minutes per bale.

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JACK B. RINCKHOFF (right), Chief Engineer, Sulphuric Acid & Phosphates Dept., Chemical Construction Corp., N. Y. City. Left, Michael De Piano, New York Cooper Alloy Representative.

RINCKHOFF OF CHEMICAL CONSTRUCTION

answers 3 questions on Cooper Alloy Valves

Q. Mr. Rinckhoff, in specifying equipment for the H_2SO_4 plants that Chemico constructs around the world, what Cooper Alloy valve models do you buy most of?

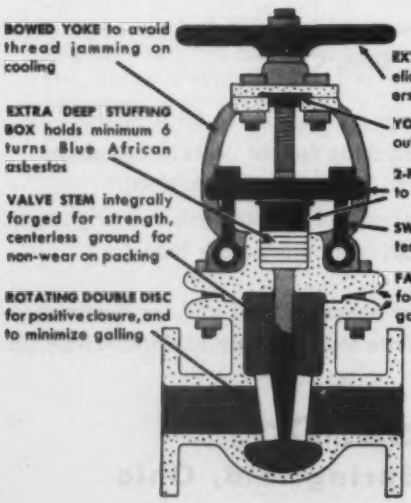
A. Over 80%, I'd say, are OS&Y type gate valves, in sizes 1"to 8"

Q. What's your most important reason for buying Cooper Alloy valves?

A. Availability. Your chain of distributors across the country and in remote parts of the world is of great importance to us. In foreign construction we have often specified Cooper Alloy because of this all-important availability.

Q. What about design and quality?

A. Vital. Valve design determines performance, and our specifications are rigid. As a construction company, we can't afford to jeopardize our reputation by installing questionable equipment. Cooper Alloy valves have passed our tough specs, and have my approval for all severe construction applications.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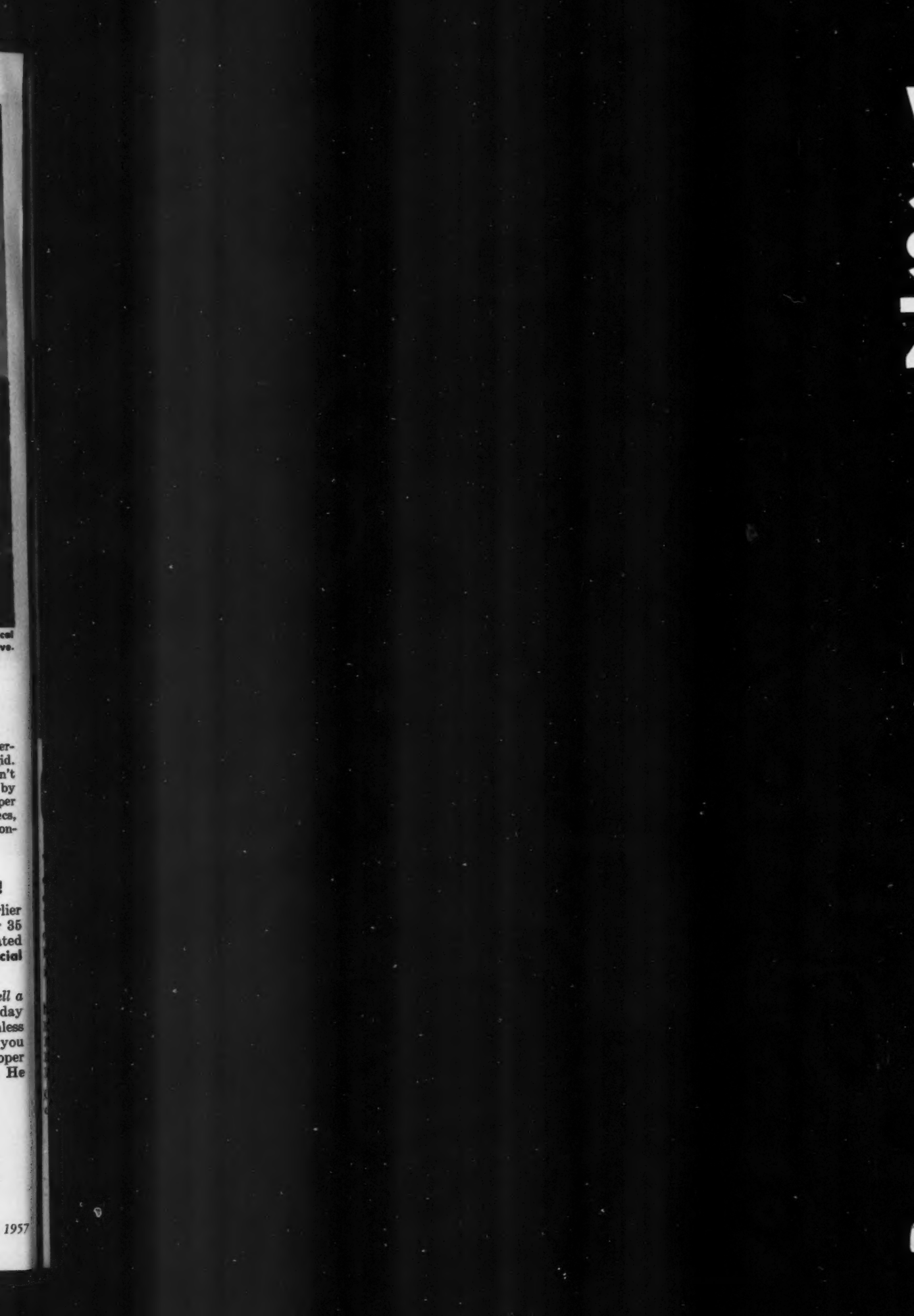

COLORFUL HOUSEHOLD PAPERS

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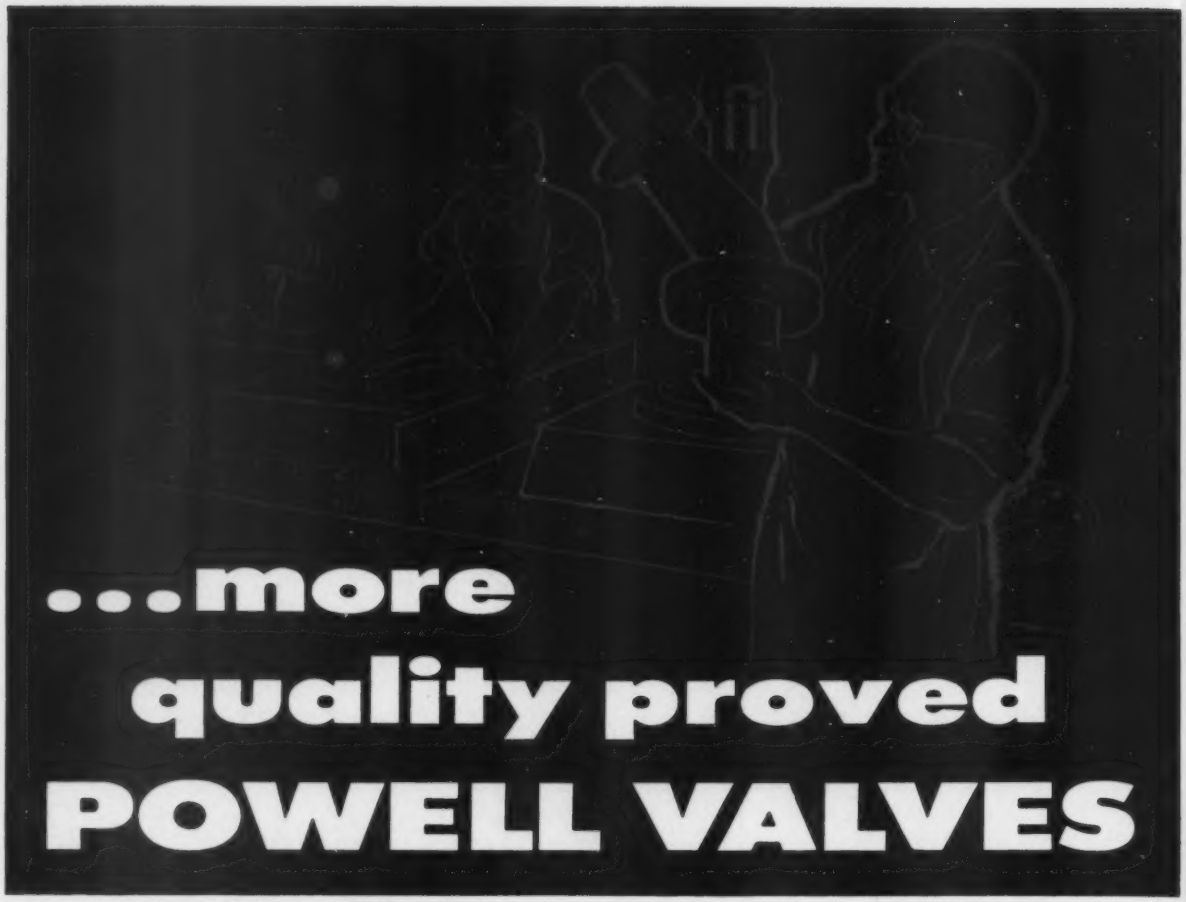

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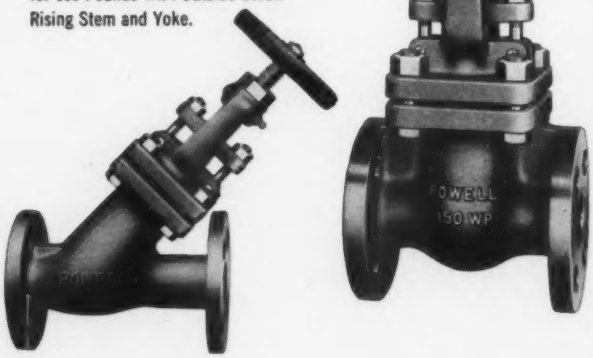
Fig. 2337—Stainless Steel Gate Valve for 200 Pounds W.P. Screwed-in Bonnet. Inside Screw, Non-rising Stem.

Fig. 1847—Small Stainless Steel Swing Check Valve for 200 Pounds W.P.

Fig. 2491—Stainless Steel O.S.& Y. Gate Valve for 150 Pounds W.P.

Fig. 2107—Stainless Steel "Y" Valve for 150 Pounds W.P. Outside Screw Rising Stem and Yoke.



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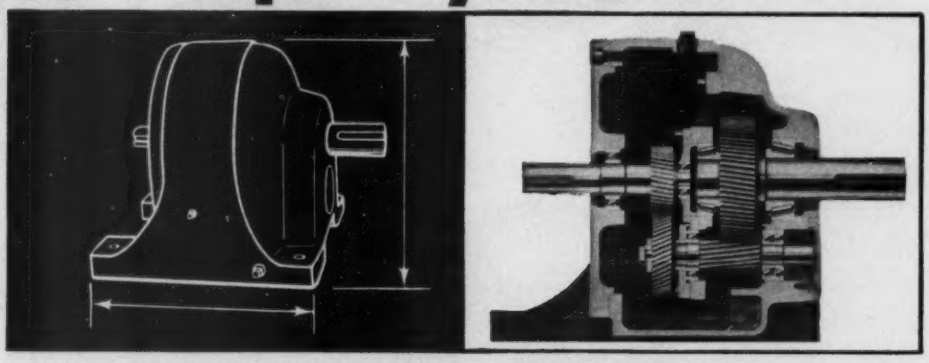

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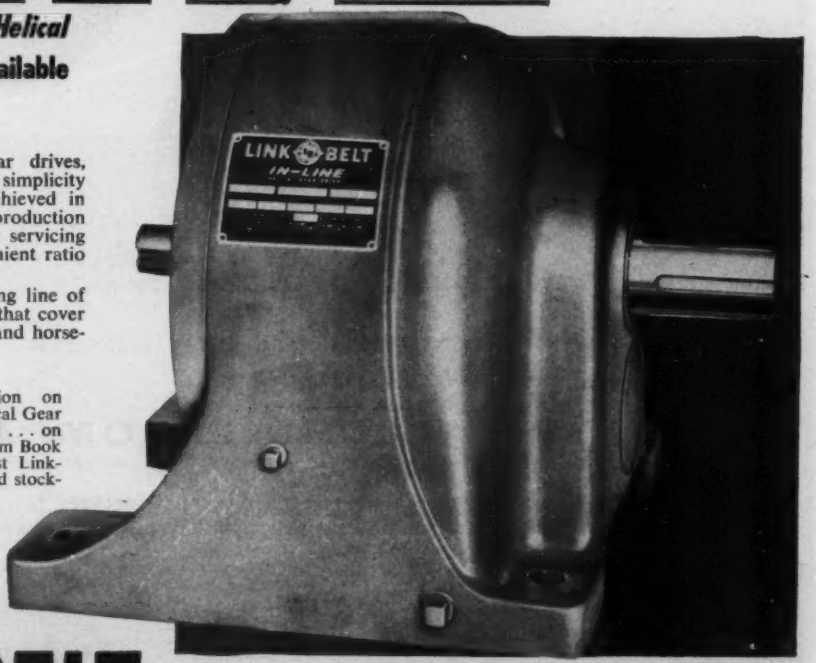

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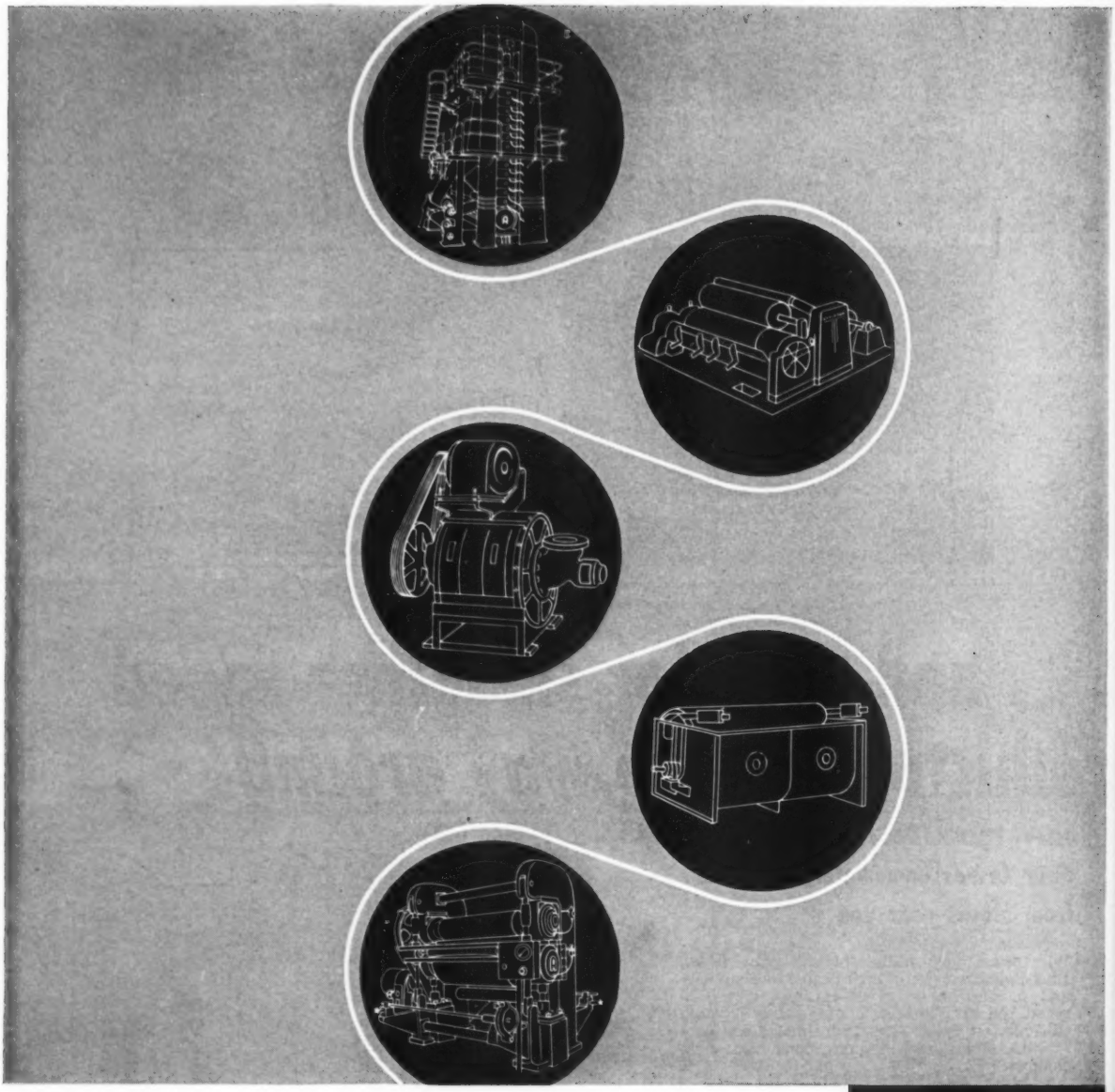

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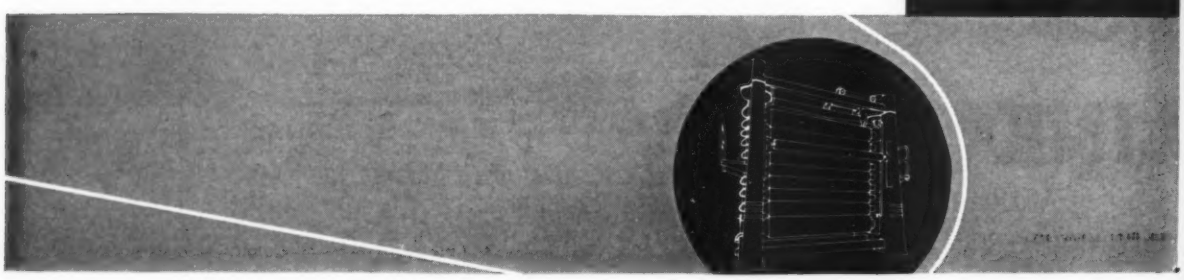

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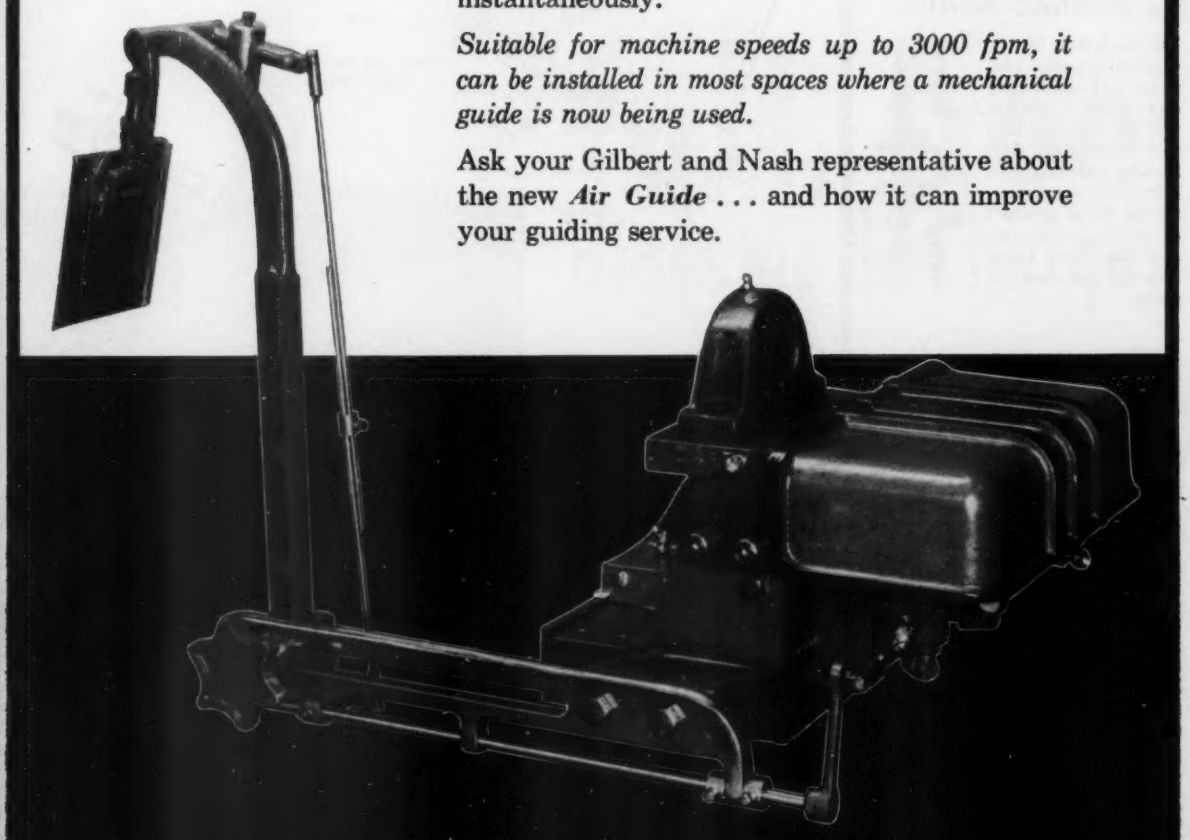
Here's a new guiding service from Gilbert and Nash . . . an efficient, economical completely air-operated guide! Simple, too—a minimum of mechanical moving parts.

The new Gilbert and Nash ***Air Guide*** has a constant rate of correction, regardless of the machine speed. And when correction is needed, there's no lag! The ***Air Guide*** reacts instantaneously.

Suitable for machine speeds up to 3000 fpm, it can be installed in most spaces where a mechanical guide is now being used.

Ask your Gilbert and Nash representative about the new ***Air Guide*** . . . and how it can improve your guiding service.



GILBERT and NASH Company

APPLETON, WISCONSIN

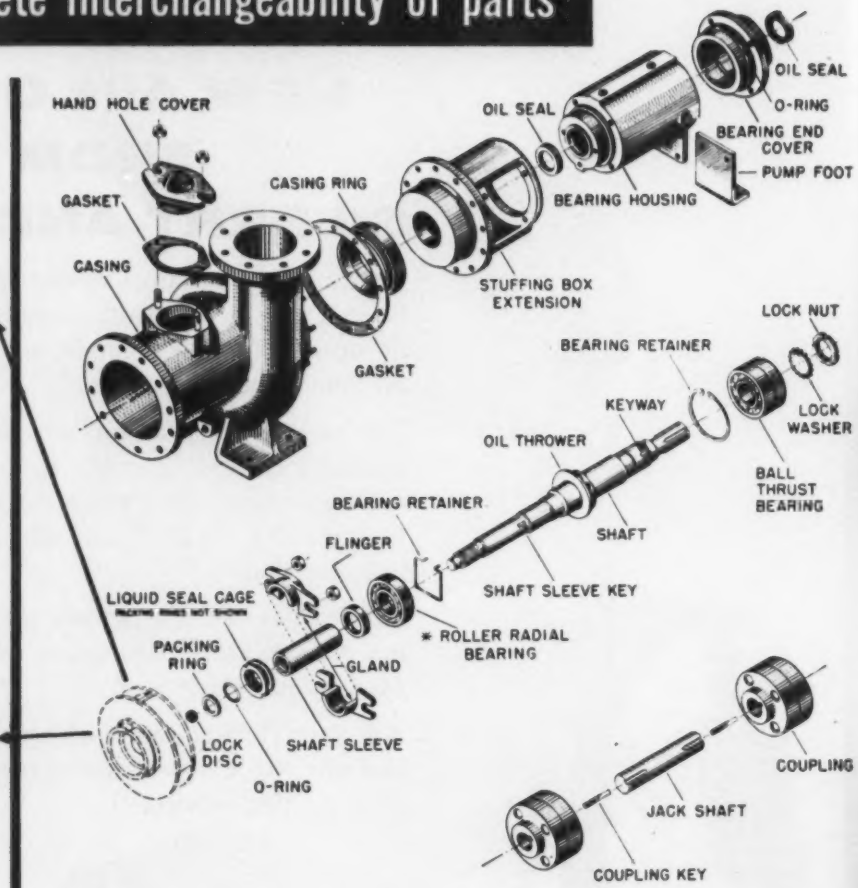
Complete interchangeability of parts

A. For normal stocks up to 4 percent consistency, use the CONVENTIONAL IMPELLER

Completely interchangeable with the diverging impeller (below). Handles stocks up to 4 percent consistency, as well as liquids of a viscous nature or liquids which contain solids.

B. For high consistency or entrained-air stocks, use the DIVERGING IMPELLER

The exclusive I-R diverging impeller prevents vapor binding and clogging, makes unit self-venting and self-regulating. Will handle stocks up to 10% consistency, containing large amounts of entrained-air or gas. *No other pump has this patented impeller.*



Ingersoll-Rand All-Purpose stock pumps can cut your spare parts inventory in half!

Now you can handle both normal stock and heavy or entrained-air stocks with one *All-Purpose* Ingersoll-Rand pump. All parts are completely interchangeable, actually *identical*, except for the two types of impellers (as explained above) and casing rings. This means that you need only *one* set of spare parts to serve pumps handling both kinds of stock.

With I-R All-Purpose stock pumps you can handle stocks up to 4% consistency with the conventional impeller . . . and simply by switching to the patented *diverging* impeller, you can handle foamy solutions containing large amounts of entrained air or gas and stocks up to 10% consistency. One pump *with two interchangeable impellers* will handle every job!

By standardizing on *I-R All-Purpose* stock pumps, you can cut your spare parts inventory at least in half . . . and you'll be able to handle stocks from lowest to highest consistency simply by changing impellers. Ask your local Ingersoll-Rand representative for details on the *All-Purpose* stock pump, or write direct.

Ingersoll-Rand

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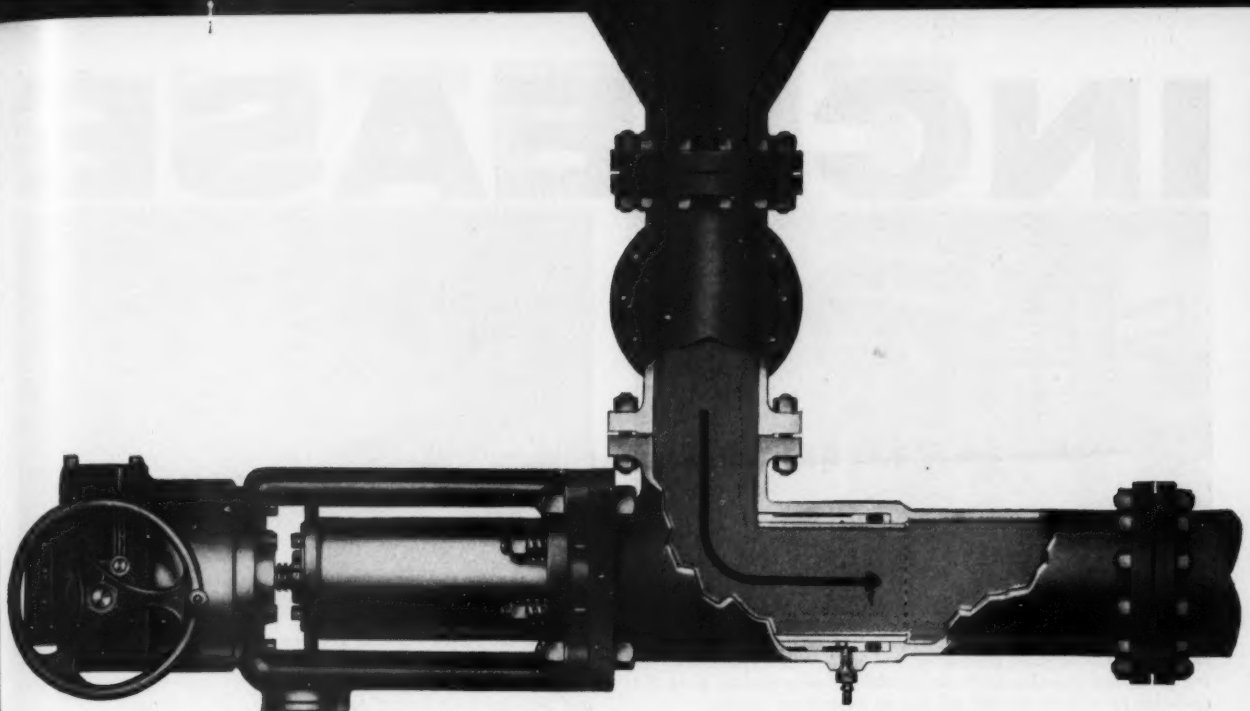
PUMPS • COMPRESSORS • VACUUM EQUIPMENT • GAS & DIESEL ENGINES • AIR & ELECTRIC TOOLS • ROCK DRILLS



full, free digester discharge

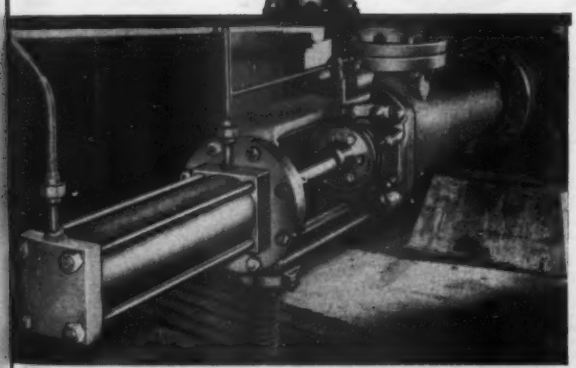
Digesters blow fast and clean with YARWAY Seatless Blow Valves.

The hollow sliding plunger has no pockets where wood chips or tramp materials can hang up.

All Yarway Digester Valves have full pipe area, permitting fast discharge with minimum pressure drop. Comparisons show greater discharge area—reducing blowing time, increasing number of cooks.

Scores of pulp mills report *lower operating costs* and *increased production* due to YARWAY Digester Blow Valves. One large mill found *savings in operation and maintenance the first year more than paid the cost of their 4 new Digester Valves!*

YARWAY Seatless Digester Valves can be furnished either with electric motor or hydraulic cylinder units. Both are remote controlled. Bulletin B-441 gives the whole story. Write for it.



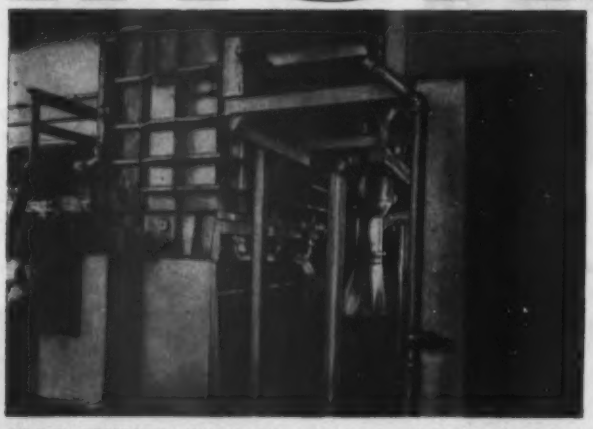
YDRAULIC-OPERATED Yarway Digester Blow Valve—one of six in-ed at large North Carolina paper mill.

OTOR-OPERATED Yarway Digester Blow Valve—one of eight installed arge Canadian paper mill.

YARNALL-WARING COMPANY
149 Mermaid Avenue, Philadelphia 19, Pa.
BRANCH OFFICES IN PRINCIPAL CITIES

· DIGESTER BLOW VALVES

INCREASE



FLOW CONTROL UNIT with multiple manifold distributor and recirculation. This unit gives improved uniformity of delivery into the pond, and together with the specially designed slice gives the optimum in uniform profile, all this at stepped-up speeds.

FOURDRINIER. The Sandy Hill removable fourdrinier permits varying components for making the entire range of fine papers. Structurally strong, simple in design, it requires least man-power motion and involves least hazard to wire during wire changes.

IMPROVE

SUCTION PRESSES — Hydraulically operated suction presses are available designed for pressures up to 1,000 pounds per linear inch of nip.

BREAKER STACKS — Properly located in the dryer section, this Breaker Stack insures best results in compacting the sheet and final fiber migration control. Designed for high nip pressures, it operates successfully on high grade printings.

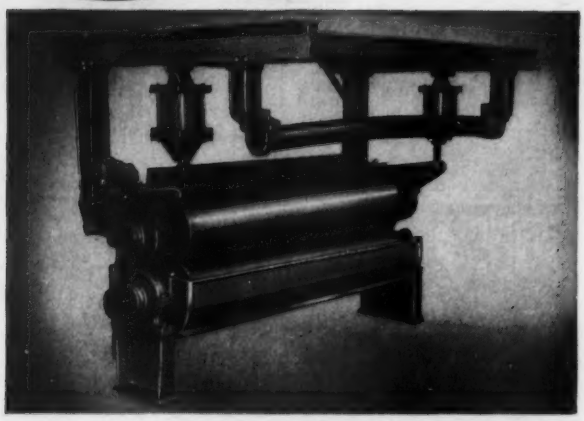
Replace obsolete equipment with Sandy Hill specialties

In many mills throughout the country Sandy Hill components are replacing obsolescent equipment at critical points in paper machines. Specially designed and engineered for efficient operation, this Sandy Hill equipment has resulted in increased speeds and improved quality of product.

Shown here are a few of the Sandy Hill specialities, adaptable to existing machines. Let us tell you more about them. At your invitation, a Sandy Hill Sales Engineer will visit your plant and offer a sound plan for machine improvements to keep your mill abreast of the increasingly competitive market.

OUTPUT

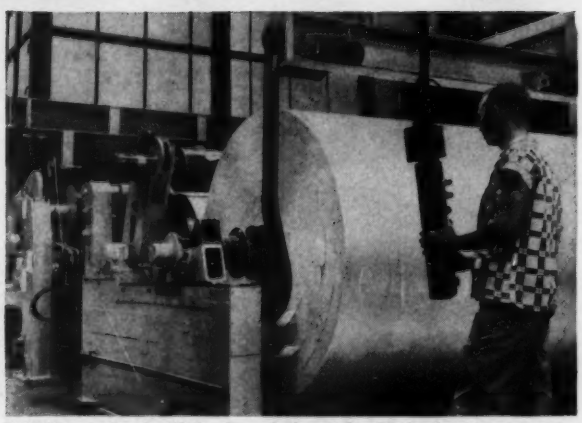
DRYERS — The Dryer Section, often the bottleneck in a modernized paper machine, is no problem when an additional nest of Sandy Hill Dryers is installed. Sandy Hill's pressure tested Dryers have more capacity per unit, so that a smaller number of Dryers meets the requirements for speeded-up production.



SIZE PRESSES — Installed on existing machines by moving dryers, these Size Presses give improved performance in sizing or pre-coating high grade papers. Overhead loading and rolls that withstand chemical action are features.

QUALITY

SELECTIVE DRIVE — Increased range and control of draw, economy of space and maintenance, and unvarying draw between sections are recognized features of the Sandy Hill Selective Drive.



REELS — Sandy Hill offers lightweight Reels for tissues, etc.; standard Pope type Reels for most types of paper; and hydraulically controlled heavy Reels for board or heavy pulp.

IMPORTANT: The first sections of our Centennial Catalog are now coming off the press. Write us now for your copies. Address Box F.

THE
SANDY HILL
IRON AND BRASS WORKS
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Basic Ingredients for Longer Life, Lower Cost Felt Performance . . .

EDUCATION *plus* EXPERIENCE

A brain-storming session in shirt-sleeves is routine procedure. L. to R.: Fritz Troelzsch, Felt Designer; Fred Heil, Felt Designer; Howard Helland, Director of Textile Research; Tom Foltz, Director of Chemical Research; Dick Buckley, Vice Pres. in charge of Sales; Howard Brown, Vice Pres. in charge of Manufacturing.

Our research, design, manufacturing and sales staffs include graduates of the colleges represented.

Carding, spinning, weaving and the like are accepted processes of the felt-maker. In a larger sense, however, the success of each TENAX FELT depends not only on plants, machinery, the skill and efforts of our workers, but also on the design, technique and engineering embodied in the felt. Broad knowledge of chemistry, paper, textiles attained in many Alma Maters . . . coupled with the kind of experience available only in the actual production of paper and board . . . are **musts** in sound felt-making. Those basics are here . . . in every department at Lockport Felt.

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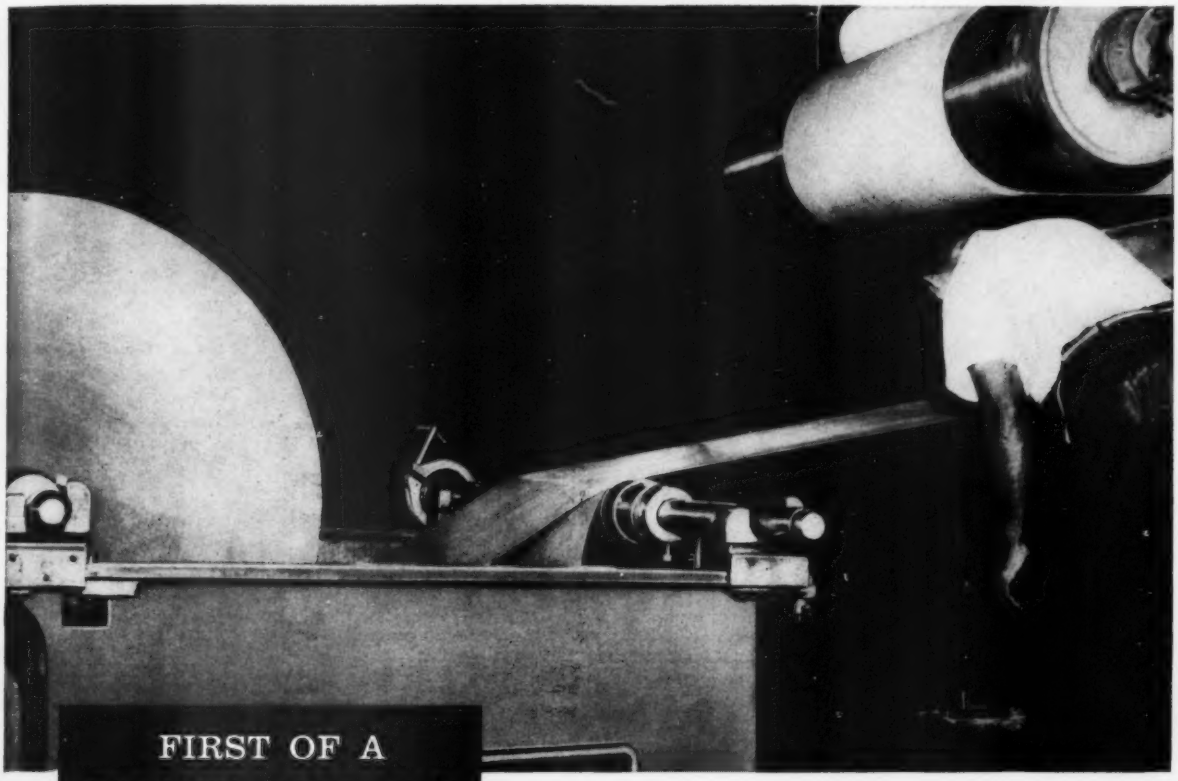
TENAX FELTS

C.P. Starches...Try 'em for Size



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Need a heavy paste of maximum adhesiveness for porous boards? Or a starch that will prevent uneven drying and curling of boards of different absorptiveness? Whether you need a starch for a highly critical operation or for general use at minimum cost, you'll more than likely find it among the Globe Starches and Dextrines—most widely used line of adhesives for corrugating and laminating.

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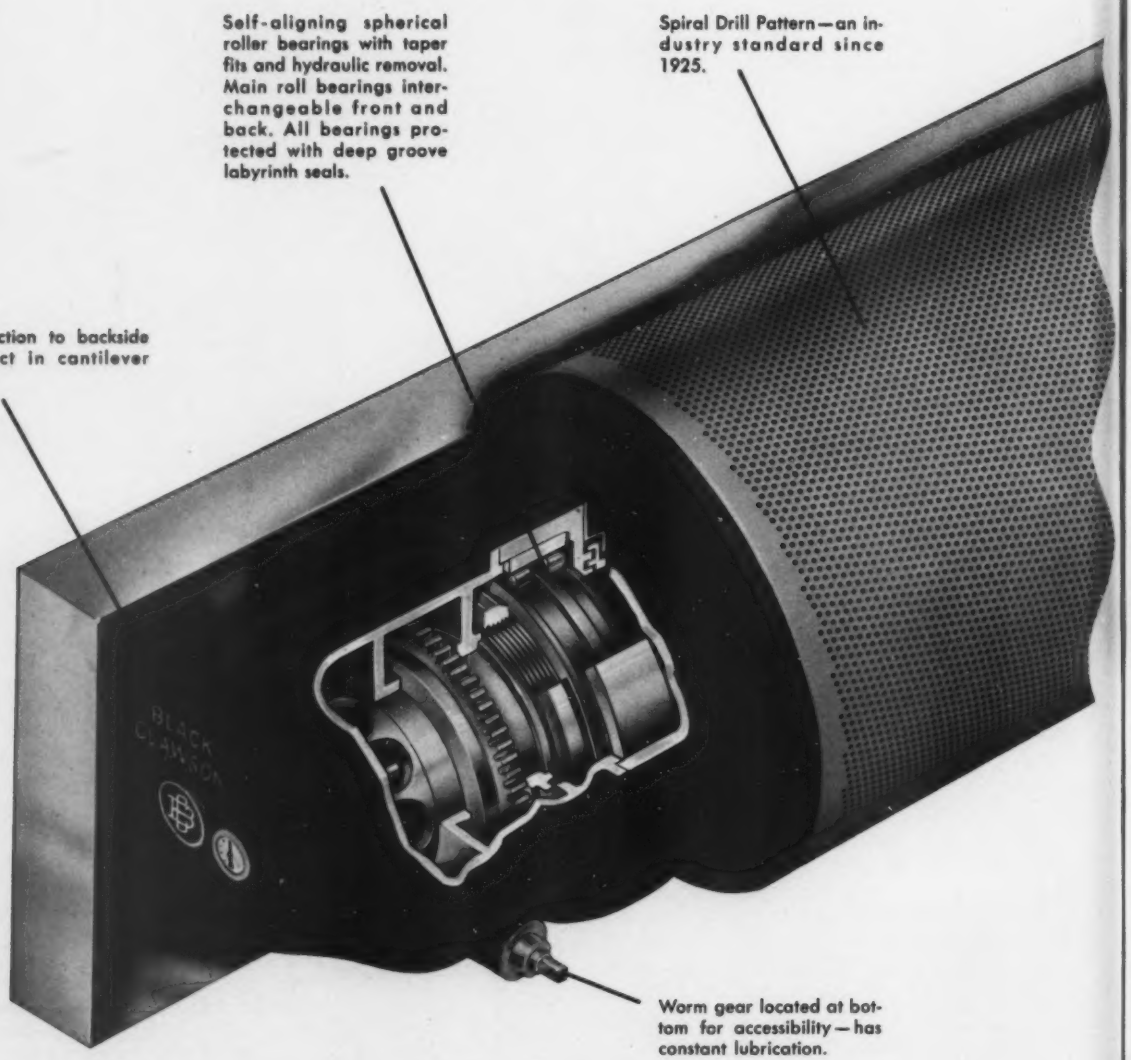
Makers also of AMIJEL,® HERCULES and TEN-O-FILM® starches for the paper industry

You can increase machine production economically with modern

Black-Clawson Suction Rolls


Self-aligning spherical roller bearings with taper fits and hydraulic removal. Main roll bearings interchangeable front and back. All bearings protected with deep groove labyrinth seals.
Spiral Drill Pattern—an industry standard since 1925.
Front suction to backside thru duct in cantilever beam.
Worm gear located at bottom for accessibility—has constant lubrication.

Wide selection of standard sizes

- 10" to 54" Diameter
- Up to 360" Face

Simplified end deckle adjustments.
Air passages are short and straight with large diameters—designed for high volumes—no obstructions.
Composition seal strips are air-loaded and water lubricated.
Extra large unrestricted suction connections.
Rigid cast iron suction boxes for either single or dual box rolls.

Illustration shows suction couch roll mounted on end cantilever beam of a Black-Clawson Hydroflyte Fourdrinier.

Less Noise • Easy to Inspect and Service

Large Air Passages • Efficient Water Removal

Simplified Design . . . Minimum Number of Parts

Black-Clawson has made many improvements in suction roll design and construction which result in faster, more efficient water removal at less cost. Many of these modern features are exclusive with Black-Clawson.

The proper application of Black-Clawson suction rolls at certain points in a paper machine will help increase machine speed, production and simplify operational problems. Experienced suction roll engineers at the Paper Machine Division can analyze your specific requirements and show you how to best utilize standard or modified suction rolls on your new and existing machines.

Call on Black-Clawson at Watertown for advice, engineering and service on all suction roll applications.

THE BLACK-CLAWSON COMPANY

PAPER MACHINE DIVISION, WATERTOWN, N. Y.

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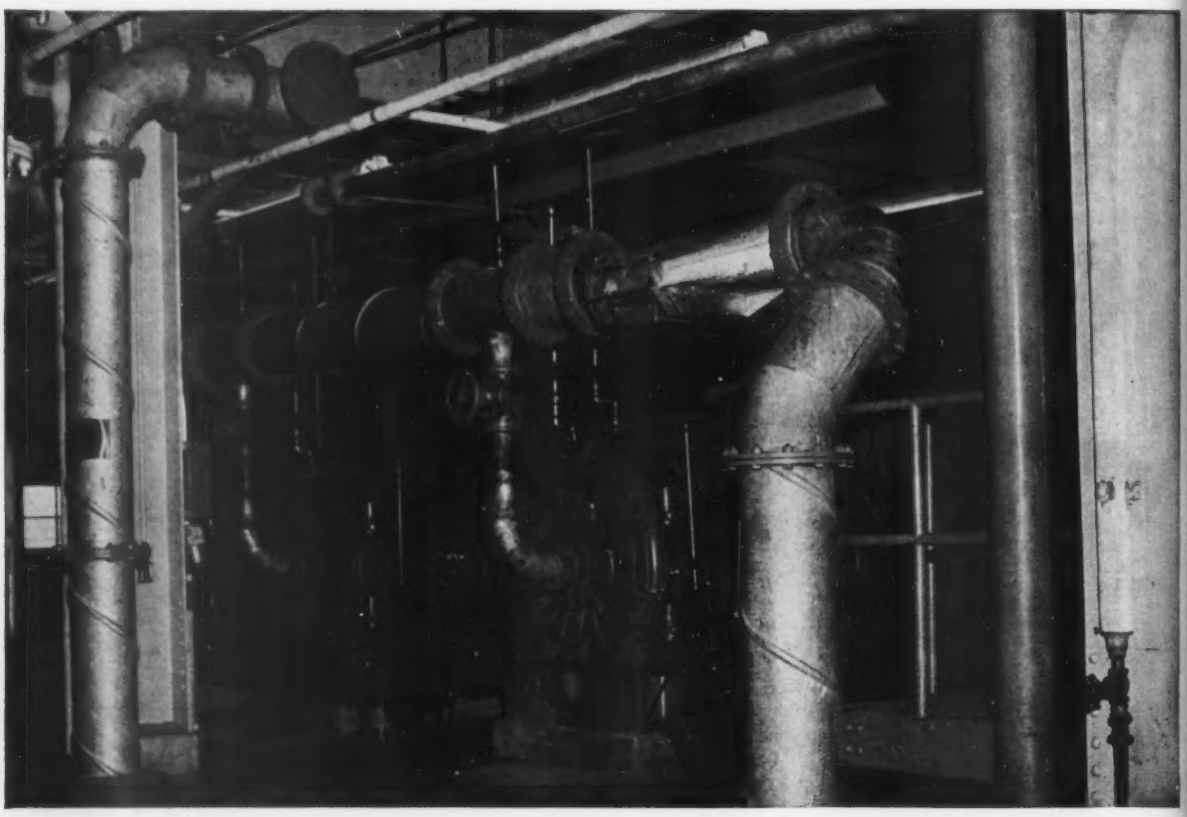
If it's In Your line . . . . .

NAYLOR Can Fabricate it!



Naylor fabrication service can give you exactly what you require for your piping layout . . . whether it's steel, alloys or stainless.

No other pipe of the same wall thickness gives you the extra strength and safety built into the exclusive Naylor spiral-lock structure. This extra performance applies to all Naylor fabrications . . . simple or complex.

To add economy to this performance, Naylor combines pipe and fittings in prefabricated units to simplify and speed up installation.

It will pay you to check with Naylor for stock pipe lengths, standard fittings, special fabrications or engineered layouts. Write for Bulletins No. 507 and No. 525 and send specifications for quotations.

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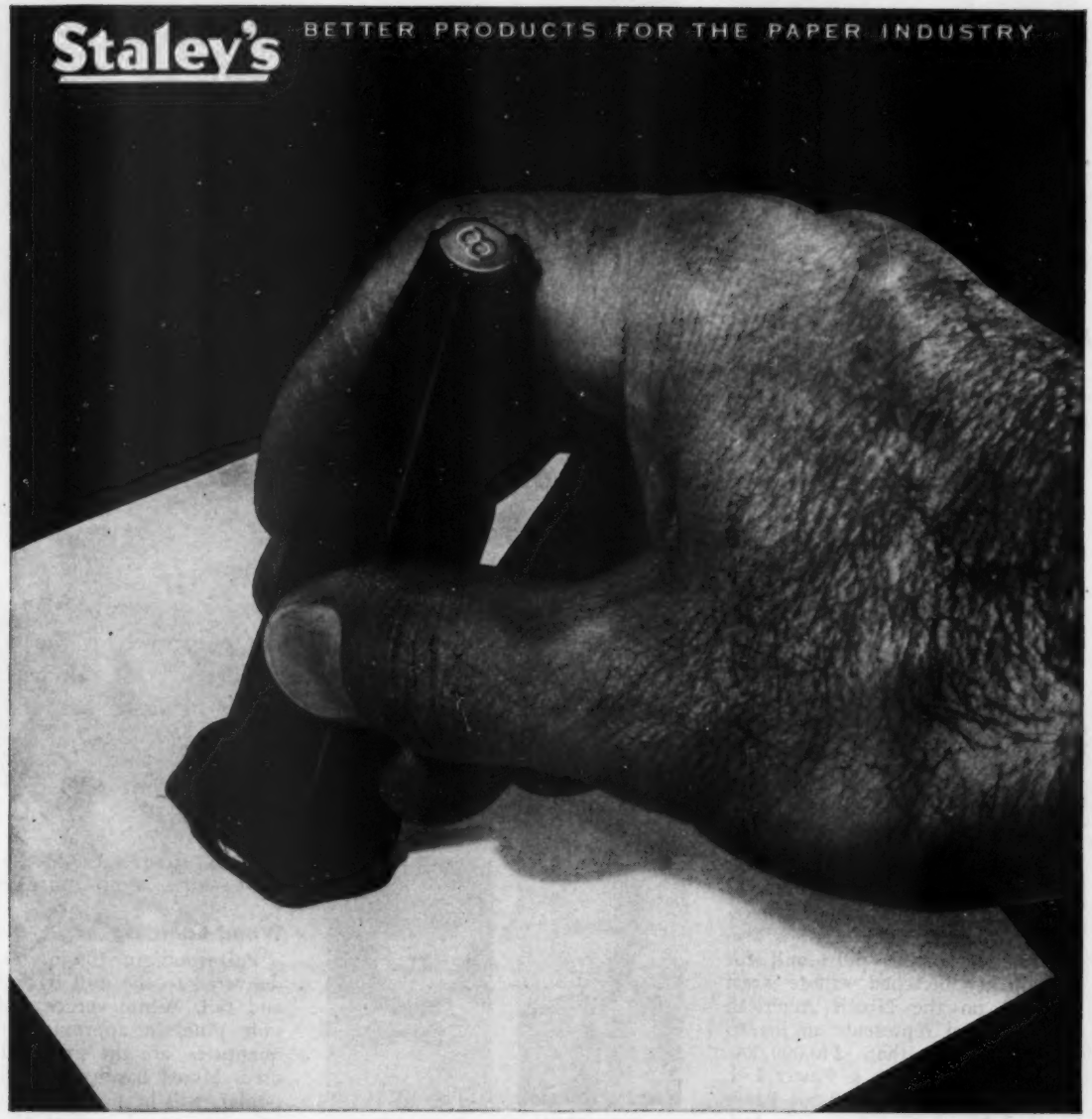
Staley's BETTER PRODUCTS FOR THE PAPER INDUSTRY



WAX-PICK TESTS PROVE...

Staley's new Stadex® Dextrin 140 gives greater binding strength in higher-solids coating colors

Higher adhesive quality! Now you can use high-solids coatings of low viscosity *without sacrificing surface strength.*

Staley's new improved Stadex Dextrin 140 solves the problem of poor binding strength in high-solids coatings once and for all. Stadex Dextrin 140 is a high-solids clay coating adhesive with excellent stability, viscosity and binding strength characteristics. Used either alone or in combination with Stayco® (oxidized) starches, Stadex Dextrin 140 produces a coating of high adhesive quality.

Long a standard in the paper industry, Stadex 140, like all Staley dextrins, is now made by a brand new dextrinization technique that guarantees you even better adhesives of top quality, minimum color and unparalleled uniformity.

Why not get the full story on Stadex 140 for yourself now?

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Feature articles

North Western Pulp & Power's continuous pulp mill in operation

Part I — Wood handling, pulping, bleaching, pulp drying and ventilation

▶ North America's first continuous pulp mill for the manufacture of high-quality bleached sulfate kraft features two Kamyr digester units equipped with pressure feeders and pre-steaming vessels.

NORTH WESTERN PULP & Power Ltd.'s mill is the first pulp mill to be constructed in Canada's resource-rich Province of Alberta. It is also the first continuous pulp mill for high-quality bleached sulfate kraft installed on the North American continent and represents an investment of more than $40,000,000. North Western Pulp & Power Ltd. is owned jointly by St. Regis Paper Co. and North Canadian Oils Ltd. St. Regis directed the design and construction of the mill, manages its operations and acts as exclusive sales agent for its output.

The rated capacity of the mill is 430 tons of bleached kraft pulp per day, or 150,000 tons annually. Approximately 500 people are employed at the mill and about 1500 persons in the logging operations.

Pulpwood is being drawn from 2,000,000 acres of Crown lands under a pulpwood lease granted by the Province of Alberta. In addition, 2,000,000 acres of timberlands have been granted to the company as a reserve for future expansion.

H. A. Simons Ltd., of Vancouver, B. C., served as consulting engineer for design of the mill and management of the construction program.

The officers of North Western Pulp & Power are as follows:

A. Thomas Easley
Resident Manager

A. C. McCorry
Gen. Superintendent

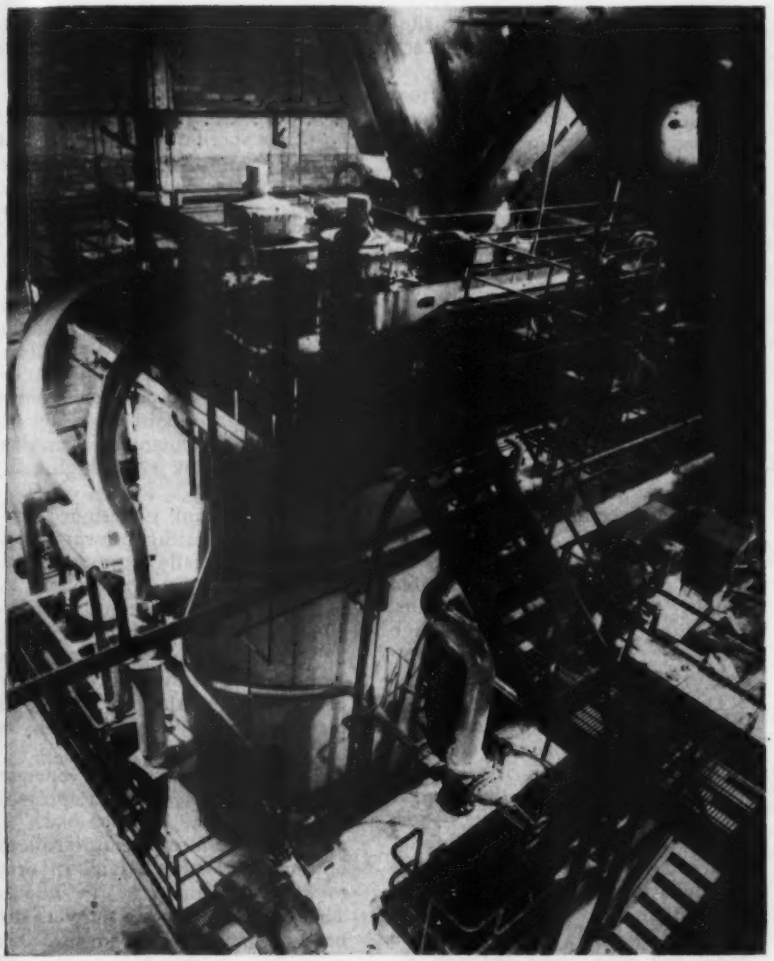
F. E. Ruben, president of North Canadian Oils, serves as chairman of the board of directors; W. R. Adams, president of St. Regis, is president; Benton R. Cancell, St. Regis executive vice president, holds a similar post with North Western; A. Carswell, executive vice president of St. Regis, and R. L. Vayo, St. Regis vice president, serve as vice presidents; J. E. Cowles, treasurer of St. Regis, is treasurer of North Western; Homer Crawford, secretary of St. Regis, is secretary of the new company; R. F. Ruben, of North Canadian Oils, is assistant secretary and assistant treasurer, as is E. F. Staberg of St. Regis.

Resident manager of the mill is A. Thomas Easley; general superintendent, Adolph C. McCorry, and W. C. Allen is office manager.

Wood handling

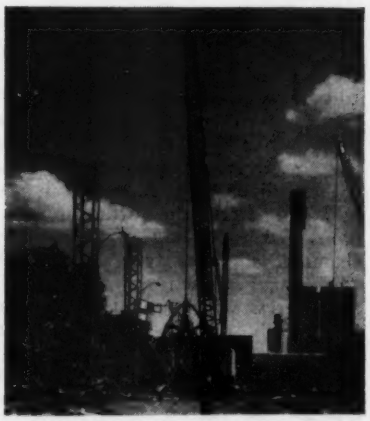
Pulpwood, in 100-in. lengths, is delivered to the mill by both truck and rail. White spruce and lodgepole pine, in approximately equal quantities, are the principal species used. Mixed hardwoods, principally poplar, will be processed separately. Wood is stored in four 50,000-cord piles, which are stacked. Wood is unloaded from the truck and rail cars by three Series 3900 B cranes equipped with 110-ft. booms. The maximum height of piles is 45 ft. In order to provide maximum fire protection, the woodyard is protected by thirty 50-ft. high fire towers complete with monitor nozzles strategically located throughout the yard.

Since the climatic conditions are such that wood can be hauled only during the winter months, adequate lighting is provided for night work by high-intensity flood light units. During the spring, summer and fall wood is reclaimed from the storage area by a concrete steel-lined log flume approximately 1800 ft. in length and 3 ft. in width. Recirculating water for the flume is provided by two vertical pumps han-

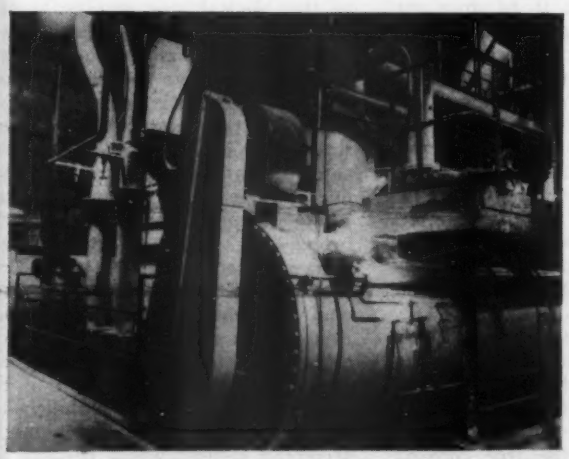


Top section of Kamyr No. 2 digester showing chip feeders and high-pressure inlets. The high-pressure feeders are capable of feeding 3400 cu. ft. per hour while rotating only at 3 rpm.

View of the continuous blow tank designed for a maximum operating pressure of 30 psi.



Wood yard showing flume, fire towers and two Manitowoc Engineering Series 3900B cranes.



View of the Kamyr chip pre-heaters (60 in. in diameter and 24 ft. long) equipped with screw conveyors and operated at 15 psi.

One of the thirty 50-ft. fire towers equipped with monitor nozzles for maximum fire protection at the North Western wood yard.

dling approximately 11,000 gpm each. A grit collector and two 10-ft. diameter disc screens are utilized in the flume to remove solids and bark from the recirculating water. Additional cleaning of flume water is achieved by the use of five Model 70 bark screens having a capacity of 1000 gpm each. In order to insure strict control of effluent, any water sewered from the flume must first pass over these screens.

During the winter months there are times when the log flume cannot be operated due to the low temperatures. Fortunately, this coincides with the hauling season, and part of the trucked wood coming into the mill may be diverted directly to a winter wood conveyor system located adjacent to the point where the log flume transfers wood to the jack ladder.

Wood is barked by three drum barkers 12 ft. in diameter by 67½ ft. long. Each drum is divided into three sections. Between the second and third section a bulkhead is provided to allow submerged barking to the degree required to accomplish full barking. Bark that is discharged from the drumbarker is conveyed to a hog of the swing-hammer shredder type. The shredded bark is then dewatered in a bark press with a rated capacity of 18,000 lb. of dry bark per hour. The bark is then conveyed directly to the spreader stoker of a combination gas-and-bark-burning boiler in the powerhouse.

The logs discharged from the barkers are transferred by conveyor and speed rolls to a 72-in. flat belt sorting conveyor, where logs are inspected. Culled logs are recirculated to the barker infeed conveyor for rebarking.

Clean logs are conveyed to two 96-in. chippers equipped with twelve 21-in. knives. These chippers, rotating at 400 rpm, have 800-hp drives and have a feed speed of 250 fpm. The knives, which are babbitted and mounted in special holders, are set to cut a uniform ⅜-in. chip. The chips are screened over four Model 522 Rotex chip screens, each driven by a 5-hp 1200-rpm motor. These screens, with their distinctive gyratory motion of the screen box, have a capacity of 20 units per hour each. Oversized chips from the Rotex screens are returned to a 36-in. re-chipper, which in turn discharges directly to the Rotex screens. Sawdust and fines from the screens are rejected directly via the waste bark conveyor to the boilers. Accepted chips are conveyed by a 42-in. belt conveyor to three concrete chip storage silos. These silos have a volume of 97,000 cu. ft. each and are equipped with steel hopper bottoms. Chips are reclaimed from the silos by three rotary plate feeders that discharge at a uniform rate directly to a belt conveyor feeding the digesters.

Pulping group

The pulping building houses the digesting, brown stock washing, screening, bleaching and chemical preparation all under one roof. All operations on these units are controlled from the fourth floor, with all of the panels and operators located at this level.

The chips are cooked by a continuous method perfected by Kamyr Inc. in Sweden after 15 years of research, engineering and pilot plant practice.

There are two digesting units installed, each with an ultimate rated capacity of 250 tons per 24 hours. The digesters, which are 95 ft. high and 13 ft. in diameter, have a volume of 10,800 cu. ft. each.

The chips from the silos are fed by a 36-in. belt conveyor to a chip hopper located at the roof elevation of the digester section of the building. The bottom of the hopper shapes into four spouts, each equipped with a Syntron vibrator. Attached to each of these spouts is a chip meter with a pocket volume of 4.75 cu. ft. These meters are equipped with a variable speed drive and feed chips through rotary low-pressure feeders into four pre-steaming vessels (60 in. in diameter by approximately 24 ft. long) equipped with screw conveyors and operated at 15 psi.

Chips from the steaming vessels are discharged directly into special rotary high-pressure feeders capable of feeding 3400 cu. ft. of chips per hour while rotating at only 3 rpm. The mixture of chips and liquor (the latter added at the high-pressure feeders) is then pumped continuously into the top of the digesters. The steaming vessels and high-pressure feeders are supported by a platform, which is attached directly to the shell of the digester. In this way expansion problems are minimized since the feeder and vessels will travel with the expansion of the digester.

The digesters are equipped with a distribution mechanism at the top to assure uniform distribution of the chips. In the upper section of the digester the chips are impregnated with liquor, and the true cooking actually commences about one-third the distance down the digester.

There are two separate cooking zones, each with its own horizontal liquor circulation and heating system. Heating of the digesters is handled by two indirect heaters, each heating a specific zone. A third heater has been installed in parallel at each digester. This acts as a spare unit so that it is not necessary to shut down the continuous cooking while any one heater is being cleaned.

At the bottom of the digester the chips are discharged through outlet devices aided by a heavy revolving discharge scraper. The pulp is discharged at 12-14 per cent consistency from the bottom of the digester into a common hour-glass-shaped blow tank 27 ft. high and 9 ft. in diameter.

This blow tank is designed for a maximum operating pressure of 30 psi but is actually operated at approximately 15 psi. The stock at the bottom of the blow tank is diluted with black liquor before flowing by gravity to five knotters. These knotters are equipped with ⅜-in. perforations on the first half of the plate and 5/16-in. perforations on the last half.

Since the blow tank is operated at approximately 15 psi pressure, it is necessary to cool the black liquor, which dilutes the stock, at the bottom of the blow tank in order to prevent flashing at the knotter. This is handled by six stainless steel heat exchangers that in turn heat water for use elsewhere in the mill.

The stock from the knotters flows by gravity to a three-stage countercurrent brown stock washer. The washer molds are 11½ ft. in diameter by 20-ft. face. Strong liquor from the brown stock washer is passed through three black liquor oxidation towers before being sent to the black liquor storage tanks.

Rejects from the knotters are conveyed by an oversized conveyor to the chip hopper above the digester for reprocessing. Stock from the discharge of the brown stock washer shredder is handled by a 48-in. belt conveyor, which distributes stock to one of three tile high-density tanks. These storage tanks hold 34 tons of brown stock each, giving a total storage capacity of 100 tons. The high-density storage tanks are equipped with high-pressure dilution nozzles and agitators and have a sloping bottom to aid sluicing of the stock to the pump suction. Stock is transferred from the high-density storage towers to the brown stock screening system, which consists of four Mark "E" Cowan screens with 0.085 perforations and one Junior

Cowan screen with 0.070 perforations. The Junior Cowan screen acts as a secondary screen. The tailings from the brown stock screening system are stored in a concrete tile-lined chest, from which they are metered to a refiner. This is a two-roll unit equipped with a 75-hp drive. The refined stock is then returned to the brown stock primary screens. Accepted stock from the primary and secondary Cowan screens flows by gravity to a vacuum decker, which has an 11½-ft. diameter by 20-ft. face mould. This decker also acts as a fourth stage in the washer system. Deckered stock is stored in two concrete tile-lined chests, each with a capacity of 7,500 cu. ft. Stock from these decker chests is then metered to the bleaching system.

Bleach plant

The bleach plant is designed for 480 tons per day of unbleached stock to the chlorine tower and 430 tons per day of bleached stock out of the system.

The Kamyr system consists of the following stages:

1. Chlorination stage in a 16-ft. diameter by 86½-ft. high low-density upward-flow chlorination tower.
2. Caustic extraction stage in a 16-ft. diameter by 39-ft. high high-density downward-flow caustic extraction tower.
3. Hypochlorite stage in a 16-ft. diam. by 39-ft. high high-density downward-flow hypochlorite tower.
4. Chlorine dioxide stage in an 18-ft. diameter by 85-ft. high high-density upward-flow chlorine dioxide tower fed by a rotary air feeder.
5. Caustic extraction stage in a 16-ft. diameter by 39-ft. high high-density downward-flow caustic extraction tower.
6. Second chlorine dioxide stage identical to that in No. 4.

All bleach washers are 11½-ft. diameter by 20-ft. face. Washer material is 316 stainless steel for the two caustic stages and the hypochlorite stage and 317 E.L.C. stainless steel for the remainder.

The mill has a continuous soda-base hypochlorite bleach-making system.

Machine room stock preparation

Stock preparation equipment for the machine consists of seven Vibrotor screens, four stages of centricleaners and a decker. Stock is pumped from the bleach high-density storage to a screen chest, where it is agitated by a 60-in. propeller-type agitator equipped with adjustable pitch blades. Stock is then pumped to the Vibrotor screens, the accepted stock going to the centricleaner chest, where the stock is diluted for feeding the centricleaners. Accepted stock from the centricleaners goes to the valveless decker, which discharges the stock into the machine chest. The chests in this system are reinforced concrete with tile linings.

Stock at 3 per cent consistency from the machine chest is diluted with white water to 2.5 per cent consistency and is pumped by a stock pump to a stainless steel stuff box, which is 30 ft. above the wet end of the pulp machine. The pH of the stock entering the machine headbox is adjusted by a recorder-controller, metering the amount of sulfur dioxide solution entering the intake of the fan pump.

The stainless steel machine headbox is a three-pond type equipped with a perforated 13-in. diameter 304 stainless steel rectifying roll. The lip is all stainless steel with two vertical adjustment hand wheels and 14 individual lip adjustment hand wheels.

The wet end is a non-shaking, non-removable fourdrinier. The 168-in wide 95 ft. long wire runs over a 22-in. diameter bronze breast roll mounted on hydraulically-operated arms and over thirty-three 7-in. diameter rubber-covered steel table rolls and a 36-in. diameter bronze suction couch roll equipped with two suction boxes 13 in. and 6 in. wide. Two 18⅞-in. diameter rubber covered presser rolls with hydraulically-oscillated shower run in contact with the couch roll. The vacuum in the couch roll is produced by a two-stage-type RCV vacuum pump.

The wire is returned by five rolls equipped with one automatic wire guide, one manual wire guide and two wire stretchers.

Water is removed through the wire by five 12-in. stainless steel suction boxes, four of which are oscillated, and one rotabelt. Also, there are two hot water weir boxes and one dandy roll. The weir boxes, the four suction boxes and the dandy roll are so mounted that they can be positioned.

The suction box vacuum and the rotabelt vacuum are produced by individual vacuum pumps.

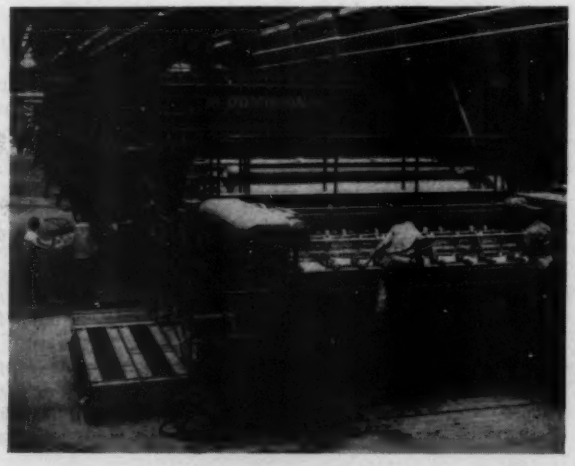
To further condition the sheet before the dryer there is a section consisting of three presses and two predryers. The first, third and fifth units of this section are straight-through presses. The first is a suction press. The bottom perforated roll is 36 in. in outside diameter and is rubber-covered. The top roll is a 32-in. bronze-covered roll. This press assembly is capable of exerting a maximum pressure of 300 lb. per lineal inch.

The third and fifth units are straight presses without suction. The bottom rubber-covered rolls are 36 in. in diameter, and the top bronze-covered rolls are 32 in. in diameter. The third unit (the second press) is capable of exerting pressures up to 750 lb. per lineal inch and the fifth unit (the third press) up to 1500 lb. per lineal inch.

All these presses are equipped with felts, felt rolls, felt stretchers and felt conditioners.

The second and fourth units are pre-dryers. They are similar in construction. The bottom and top rolls are 60 in. in diameter and operated off an 80-lb. steam header.

The fourdrinier is equipped with an automatic system controlling the



Dry end of Dominion Engineering's pulp machine. The 450-ton Minton dryer is totally enclosed and comprises 66 dryers.

basis weight of the sheet. A continuous weighing scale between the pre-drying section and the dryer controls the amount of stock flowing from the stuff box to the fan pump.

The 164-in. Minton dryer has sixty-six 60-in. dryer rolls and is divided into two sections, each having its own top and bottom felts. The 28 in. of vacuum in the dryer is supplied by a network of jet condensers, a steam ejector and two piston-type positive displacement vacuum pumps.

The sheet enters the dryer through seal rolls at the wet end and leaves through a similar set at the dry end. These include at each end two chromium-plated rolls and one movable rubber-plated roll. The seal between the chromium-plated roll and the dryer frame is maintained by a rubber strip. The rubber roll maintains the seal between the pulp sheet and the chromium-plated rolls.

The pulp sheet is fed into a heavy duty pulp cutter, which will cut either pulp or wrapper sheets. It is then discharged to a continuous automatic layboy that stacks the sheets into 500-lb. bales. The swing table transfers the stacked sheets to a storage belt conveyor with wrapper pickup section. The pulp stacks feed through a scale with discharge unit to the 1000-ton baling press. The bales are tied on an automatic wire-tying machine and discharged to a 30-in. belt conveyor 170 ft. long, which carries the bales to an automatic lowerator-stacker in the pulp warehouse. All the equipment is tied together with conveyors electrically, making the whole system automatic.

The machine drive

The machine operating at a maximum speed of 500 fpm is driven by a conventional multiple-generator sectional machine drive with each section motor powered by its own generator. Speed and position control of nine regulated sections is provided by means of differential error detectors and Magamp amplifiers. The couch section is driven by a 150-hp motor; the first, second and third presses are driven by 100-hp motors; the Minton dryer has two 30-hp motors on the entry seal rolls and two 30-hp motors on the exit seal rolls, with 100-hp units driving the first and second dryer sections. The cutter section is driven by a 30-hp motor equipped with speed control only.

Two multiple-unit M.G. sets, each driven by a 400-hp synchronous motor, supply power to the nine regulated sections.

The dc control equipment, including relays, contactors, magnetic amplifier (Magamp) assemblies and auxiliary components, is mounted in NEMA I sheet steel enclosures.

The main function of the regulating system is to lock these sections together to insure accurate maintenance of relative speed between the sections regardless of load and draw variations. The position-speed matching system meets this requirement.

The position-speed matching system utilizes the adjustable frequency output of a small alternator on a master set as a standard of comparison. The master set consists of a dc motor driving an alternator. The speed of the master set is adjusted by the operator. Its speed is directly proportional to the required operating speed of the paper machine. The adjustable frequency supply from the master set is used to power small synchronous motors, each forming a part of the differential error detector unit on regulated sections of the machine. The error detector unit consists of a cone pulley driven by the regulated section motor. The driven cone pulley is belted to a second cone pulley in which the ring gear of the mechanical differential is located. A plus or minus 12.5 per cent draw adjustment is provided in the taper of the cone to adequately take care of the draw adjustment requirements and reduction of roll size due to machining.

The sun gear of the mechanical differential is driven by the synchronous motor, which receives its frequency from the master set. The planet gear, located on the differential crank, turns on its own bearing during the steady state operating condition but turns in space relation only when making an error correction. The differential output shaft is geared to both position and differential speed-cueing devices. These devices are in motion only during the correction period. Under steady state conditions the only moving elements of the regulator are the cone pulleys and the synchronous motor.

The two signals produced by the error-detecting units are fed to a control unit, which contains two stages of magnetic amplifiers, a first stage unit for amplifying the electrical signals from the error detector unit and a second stage for furnishing controlled excitation to the shunt field of the regulated generator. The constants of the regulator are so arranged that the speed signal amplification is high as compared to the position signal amplification. Thus, when load change occurs considerable forcing is obtained to restore the regulated section to its original speed.

Heating and ventilating system

Many new ideas were incorporated into the heating and ventilating system serving the machine room, pulping group (including digester building) and woodroom.

The machine room installation consists of two large central-station air supply units that discharge into duct systems. The air from these units is introduced to the roof area as well as the working zones and basement. For removal of hot moist air, exhaust fans of propeller type are located on top of the roof as well as in the walls.

The machine room installation also includes separate cooling systems for the main drive motors, as well as vacuum pump and fan pump drive motor.

The main supply for the pulping group comes from one large central-station unit located on the machine room roof. Air is distributed on the three lower floors through conventional duct systems. For the washer floor there is a false aluminum ceiling covering an area of close to 19,000 sq. ft. and consisting of 1200 individual aluminum panels. The air is introduced through air diffusers mounted in the false ceiling.

The pulping group electrical room has a separate air supply system with the unit located on the bleach plant roof.

Room exhaust throughout the entire bleach plant is provided by means of propeller fans, which are mounted in the side walls. In the same manner, provision is made for emergency air supply. There are three independent exhaust systems for the removal of vapors from washers, knotters, seal tanks, HD tanks, bleach towers, conveyors, etc.

The first system removes vapors from knotters, brown stock washers and the brown stock decker. It was decided that no overhead ducting should be installed on the washer floor, nor was the conventional type of washer hood to be used. This led to a design for the washer enclosure which could be called a combination damper-hood. Each washer is enclosed from the top of the vat on the inlet side to the vicinity of the press roll and is equipped with a set of damper blades which allow observation as well as adjustment of air flow. A take-off duct is installed across the vat on the inlet side and

Principal equipment at North Western Pulp & Power's new continuous pulp mill

Wood handling

Bark hog, swing-hammer shredder type ..... Gruendler Crusher & Pulverizer Co.
Bark press (1), 18,000-lb./hr. capacity .. Hydraulic Machinery Co. Ltd.
Bark screens (5), Model 70, 1000 gpm, for cleaning of flume water ..... Thomas A. Dillon & Co. Ltd.
Beta-meters ..... Fischer & Porter (Canada) Ltd.
Chippers (2), 96-in. diam., 12 knives ..... Carthage Machine Co.
Chipper motors (2), 800-hp synchronous provide 275% pull-out torque ..... Canadian Westinghouse Co. Ltd.
Chip screens (4), Rotex Model 522, 20 units/hour capacity each ..... Orville Simpson Co.
Cranes (3), Series 3900 B ..... Manitowoc Engineering Works
Disc screens (2), 10-ft. diam., to remove solids and bark from flume water ..... Link-Belt Co.
Drum barkers (3), 12 by 67½ ft., three sectional ..... Fibre Making Processes Inc. (made by Horton Steel Works Ltd.)
Grit collector ..... Chain Belt Co.
Knife grinder ..... Canadian Sumner Iron Works Ltd.
Pumps (2), vertical, 11,000 gpm, for water recirculation in flumes ..... Byron Jackson of Canada Ltd.
Re-chipper (1), 36-in. ..... Canadian Sumner Iron Works Ltd.
Rotary plate feeders (3) on chip silos ..... Link-Belt Co.
Silos (3), concrete, 97,000-cu. ft. capacity each, equipped with steel hopper bottoms .... Canadian Stebbins Engineering & Mfg. Co. Ltd.

Pulping group

Black liquor oxidation towers (3) ..... B.C. Research Council
Blow tank, hour-glass shaped, 9 ft. in diam., 27 ft. high ..... Dominion Bridge Co. Ltd.
Brown stock screening system, 4 Mark "E" and 1 Junior Cowan screens ..... Appleton Machine Co.
Brown stock washer (1), three-stage, counter-current, Impco type ..... Sherbrooke Machineries Ltd.
Digesters (2), continuous, Kamyr type, 250-ton/day capacity each, 95 ft. high, 13-ft. diameter ..... Dominion Bridge Co. Ltd. (built to Kamyr specifications)
Haug refiner (1), two-roll unit, driven by a 75-hp motor ..... Canadian Ingersoll-Rand Co. Ltd.
Heat exchangers (6), stainless steel, for cooling black liquor ..... Rosenblad Corp. of Canada Ltd.
High-density stock tile tanks (3), 34-ton capacity each, equipped with Impco high-pressure dilution nozzles and agitators ..... Canadian Stebbins Engineering & Mfg. Co. Ltd.
Johnson Knotters (5), ⅜- and 5/16-in. perforations ..... Canadian Ingersoll-Rand Co. Ltd.
Liquor heaters (6) ..... Electric Steel Foundry Co.
Liquor circulation pumps ..... Bingham Pump Co.
Liquor circulation systems (4), horizontal .. Electric Steel Foundry Co.
Pre-steaming vessels (4), 15 psi, equipped with screw conveyors ..... Kamyr Inc.
Revolving discharge scrapers (2) ..... Kamyr Inc.
Rotary high-pressure feeders, 3,400-cu. ft./hr. capacity ..... Kamyr Inc.
Rotary low-pressure feeders ..... Kamyr, Inc.
Tile-lined chests (3) .. Canadian Stebbins Engineering & Mfg. Co. Ltd.
Vacuum decker (1), 11½-ft. diameter, Impco type ..... Sherbrooke Machineries Ltd.

Bleach plant

Bleach plant ..... Kamyr Inc.
Bleach plant tower shells (6) ..... Horton Steel Works Ltd.
Caustic extraction towers (2), 16-ft. diam., downward flow ..... Kamyr Inc.
Chlorination tower (1), 16-ft. diam., upward flow ..... Kamyr Inc.
Chlorine dioxide generators, Mathieson type ..... Knapp Mills Inc.
Chlorine dioxide towers (2), 18-ft. diam., 85 ft. high ..... Kamyr Inc.
Hypochlorite tower (1), 16-ft. diam., downward flow ..... Kamyr Inc.
Rotary air feeders (2) on chlorine dioxide towers ..... Kamyr Inc.
Tile linings ..... Canadian Stebbins Engineering & Mfg. Co. Ltd.
Washers (6), 11½-ft. diam., 20-ft. face, three made of 316 stainless steel and three of 317 stainless steel, Impco type ..... Sherbrooke Machineries Ltd.

Stock preparation

Centri-cleaners ..... Bauer Bros. Co.
Consistency regulators ..... DeZurik Corp.
Duplex volume pumps ..... Milton Roy Co.
Stock chest agitators ..... James Brinkley Co.
Tile-lined chests ..... Canadian Stebbins Engineering & Mfg. Co. Ltd.
Valveless decker, Impco type ..... Sherbrooke Machineries Ltd.
Vibrotor screens (7) ..... Canadian Ingersoll-Rand Co. Ltd.

Pulp machine room

Baling press (1), 1000-ton capacity ..... Washington Iron Works
Dryer, Minton type, 164-in., with sixty-six 60-in. dryer rolls ..... Dominion Engineering Co. Ltd.
Fourdrinier, 168-in. wire, with five suction boxes and suction couch roll ..... Dominion Engineering Co. Ltd.
Headbox, 3-pond type, stainless steel, equipped with 304 stainless steel rectifying roll ..... Dominion Engineering Co. Ltd.
Layboy, continuous-automatic ..... Lamb-Grays Harbor Co.
Lubricating system ..... Bowser Inc.
Machine drive, multiple-generator sectional with Magamp control ..... Canadian Westinghouse Co. Ltd.
Machine drive motors (9), one 150-hp on couch; three 100-hp on first, second and third presses; two 100-hp on first and second dryer section of the Minton dryer; three 30-hp on seal rolls and cutter ..... Canadian Westinghouse Co. Ltd.
M. G. sets (2), multiple unit type, supply power to machine drive motors .... Canadian Westinghouse Co. Ltd.
Motors for M.G. sets (2), 400-hp, synchronous ..... Canadian Westinghouse Co. Ltd.
Press section, consisting of three presses and two predryers ..... Dominion Engineering Co. Ltd.
Pulp cutter ..... Lamb-Grays Harbor Co.
Scales ..... Toledo Scale Co. of Canada Ltd.
Seal rolls (6) on Minton dryer, four chromium-plated and one rubber-clad ..... Dominion Engineering Co. Ltd.
Vacuum pumps (5), two compound units and three single stage ..... Roots-Connersville Blower (Canada) Ltd.
Vacuum pumps (2) on Minton dryer, piston-type, positive displacement ..... Canadian Ingersoll-Rand Co. Ltd.

serves at the same time as a walkway. Knotter hoods and immediate ducting are fabricated of polyester, and the brown stock washer hoods and ducting to the exhaust stock is fabricated of stainless steel.

The second exhaust system removes vapor from bleach washers, high-density tanks and bleach towers. The bleach washer enclosures are of similar design as the brown stock washers but are made of black sheet iron covered with polyester. The ductwork for this system is entirely of polyester.

The third system removes vapor from seal tanks only and is made of polyester also.

Another installation provides ventilation for the oxidation towers. Automatic control equipment is provided for the whole ventilation system.

(Part II—describing chemical recovery, steam and electrical power, water treatment and waste disposal—will appear in the August issue.)

Some of the more recent uses of chemicals in the manufacture of wood pulp

WARREN BEAZLEY*

Part 1—Chemicals in debarking of wood

The most widely-used chemicals for debarking are the arsenites. If a single average-size pulp mill were to debark all its trees chemically, it would require as much as 15 tons of sodium arsenite annually.

MECHANICAL AND HYDRAULIC methods of removing bark from logs require equipment which has a high initial cost. These methods may also entail high maintenance costs. In addition, there is also some physical loss of wood, and in some cases there is excessive "brooming" of the ends of the logs, which subsequently may lead to certain operational difficulties associated with dirt in the pulp.

There is a period, i.e. the spring or early summer, when the bark is quite easily peeled in long strips from the freshly felled trees. This is referred to as "sap-peeling".

If the period of sap-peeling could be extended and if the bark could be permanently loosened from the tree, a greater degree of sap-peeling could be practiced. Moreover, if the bark were loosened and the logs river-driven to the mill, the pulpwood would lose a great deal of its bark in transit. Any remaining bark could then be more easily and cheaply removed in the conventional mechanical debarking equipment.

It was known as early as 1937 that arsenicals would promote bark loosening. However, the first serious proposal for the use of chemicals to facilitate bark removal from standing trees was made by A. R. White. He was granted Canadian patent No. 407,221 on September 8, 1942, and U.S. Patent No. 2,324,968 on July 20, 1943.

In the following years chemical debarking has been practiced by several pulp and paper companies in the United States and in Canada. The usual practice is to girdle the tree, i.e. remove a band of bark completely around the tree and apply the appropriate chemicals to the exposed sapwood. The details of bark removal and chemical application vary, of course, from company to company.

The treated tree dies in about a week or ten days. A period of one to two months is necessary before maximum loosening occurs; following this the tree is felled and peeled. While there will be some bark loss between felling and peeling, due to the effects of freezing, thawing, wind; etc., some manual work may be necessary to completely remove the bark. If the felled tree is sent directly to the mill, river-driving itself will remove most of the remaining bark.

Advantages of chemical debarking

Among the advantages claimed for chemical debarking of wood are the following:

(1.) It is cheaper, faster and less laborious than sap-peeling.
(2.) It is cheaper and less wasteful than mechanical barking.
(3.) It permits almost year-round production of peeled wood.
(4.) It is of value in planning and implementing logging schedules and also in the silvicultural treatment of forests.
(5.) Since the tree dies before it is felled, in the case of softwoods it will lose appreciable amounts of moisture. This may reduce sinkage losses if the wood is floated down the river or reduce freight costs if the wood is shipped by rail.

Chemicals used

The most widely used chemicals for debarking are the arsenicals such as sodium arsenite, potassium arsenite and ammonium arsenite, as well as mono- di- and tri-ethanolamine arsenite and isopropylamine arsenite.

Among other chemicals that have been studied for this application are ammonium sulfamate, copper sulfamate, copper sulfate, copper chloride, Esteron 245, ferrous sulfate, potassium dichromate, potassium persulfate, sodium bisulfate, sodium chloride, sodium fluoride, sodium chlorate, sodium pentachlorophenate, sodium selenate, sodium sulfamate, sodium tellurate, sulfonic acid, trichloracetic acid and its salts, zinc chloride, 2, 4 diclorophenoxyacetic acid, trichlorophenoxyacetic acid, sodium metaborate, sodium cyanamide, ammonium bifluoride, potassium cyanate, dinitrophenol, sodium iodoacetate, sulfite waste liquor and several others.

With the exception of arsenites, these chemicals are for the most part not very effective or completely useless. All arsenicals, on the other hand, are highly effective unless diluted to less than 10 per cent arsenic content.

Debarking with sodium arsenite

A 40 per cent sodium arsenite solution is found most effective for debarking purposes. A stain or dye is usually incorporated into the arsenite solution to avoid errors. A green stain or dye is recommended. The use of bright colored dyes, such as red, is not recommended because

(Continued on page 319)

*Manager of pulp pilot plants and pulp development for Industrial Cellulose & Research Ltd., Hawkesbury, Ont.

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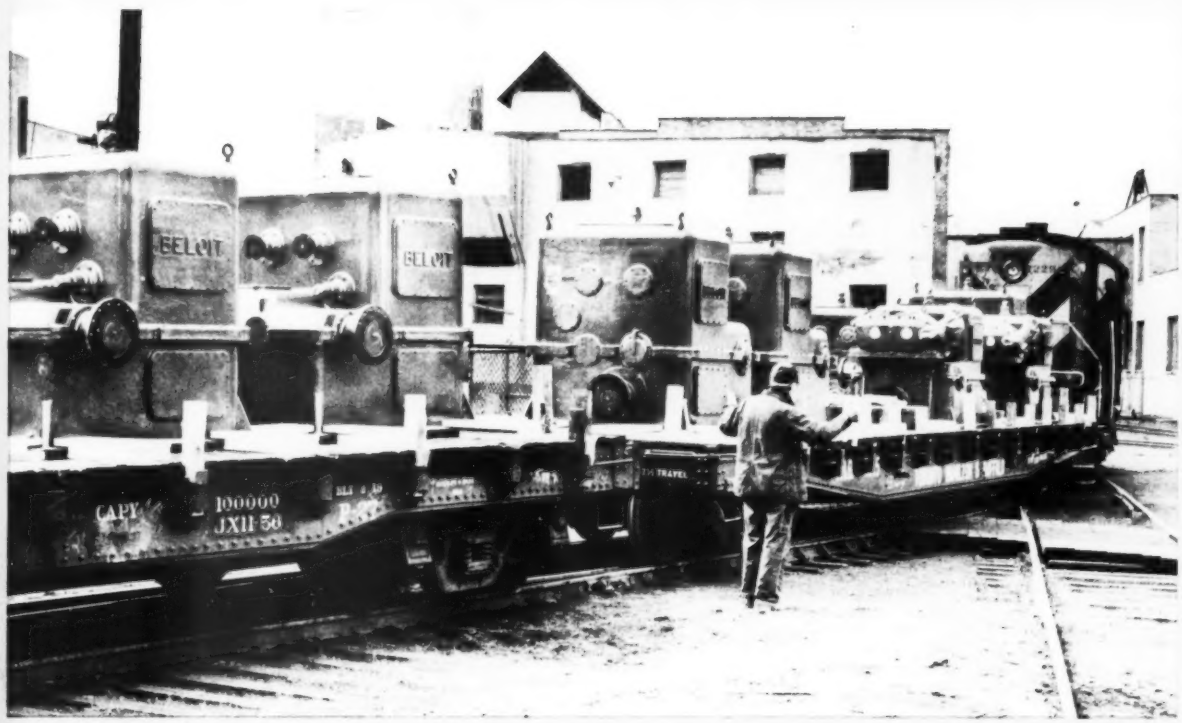
The Beloit Album



FIVES AND THREES, LOADED AND ROLLING. Cars loaded with five size and three size differential drives move out of a Beloit Iron Works siding toward the main line. Beloit developed and has been supplying these drives to mills since 1951. Mills have profitably applied the Beloit differential drive to machines making rag-content paper at several hundred feet per minute and to wide high-speed machines producing food-container board, corrugating medium, kraft grades, and newsprint.

MARATHON CORPORATION's chief engineer George Wachter *(r, c)* and production manager John Bard *(l, c)* discuss diaphragm loading on a size press with Bud Hammill *(r)* and Beloit's chief engineer, Sterling Skinner.

CARTIERE BURGO's technical director Dr. Piero Bersano *(l)* reviews current Italian papermaking problems with Harry Moore *(c)*, Beloit president, and Gaston Bertrand, vice-president, Beloit International Corp., C.A.

MEET YOUR ERECTOR

No. 1 of a series

HARVEY ROHR, a Beloit erector for 20 years, has played an important role in the erecting of Beloit equipment in paper mills around the world. You might see him in a tight spot such as pictured above, where a supercalender main frame ladder is getting a final fastening under Harvey's experienced eye. Beloit erectors provide a vital link with our customers. They are the men at the end of the production cycle—technicians whose responsibility it is to put Beloit machines in running order and to help get a salable sheet on the reel as quickly as possible. Beloit is justly proud of its erectors . . . truly "your partners in papermaking."

PAPETERIES DE FRANCE technical manager Michel Rouilly *(l)* is pictured with K. G. Fries, Beloit sales representative. They are discussing a 48" reel drum—which has since gone into operation on a four-roll newsprint machine.

MAC MILLAN & BLOEDEL LIMITED's Don Brewster *(c)*, assistant to the vice-president, is flanked by a Beloit father-son combination: Russ Olson *(l)*, chief of customer service, and Anton Olson, engine lathe operator.

EXPERIMENTAL setup in Beloit's research and development laboratory tests wire life with drilling patterns and suction box material. *(l to r)* John Hoover, research; Mike Cobb, staff engineer; Charles Walker, research physicist.

CROSSETT PAPER MILL's manager J. C. Hair *(l)* and Ed Beachler, vice-president, engineering, Beloit, are shown discussing Beloit equipment during an engineering conference at Beloit Iron Works.

WAUSAU PAPER MILL's design engineer Warren Johnson *(l)* and chief engineer Joe Kuhns *(l, c)* examine flexible mounting on a forming board. F. R. Erbach, sales engineer *(r)*, and D. J. Mattison, erector, explain arrangement.

MARATHON-ROTHSCHILD's mill superintendent Richard M. Elias *(r)* and A. F. Broecker, plant engineer *(c)*, pick up a fine point or two regarding the grinding of a Yankee dryer from A. E. Rounds, Beloit grinder operator.

MORRIS PAPER MILLS visitors pause in the dryer shop to watch polishing of a bearing surface. Standing *(l to r)*: George Wilford, Beloit boring mill operator; P. O. Pringle, Beloit; Tom Beckwith, Morris. Kneeling *(l to r)*: Robert Beckwith and Alvin Yonker, Morris.

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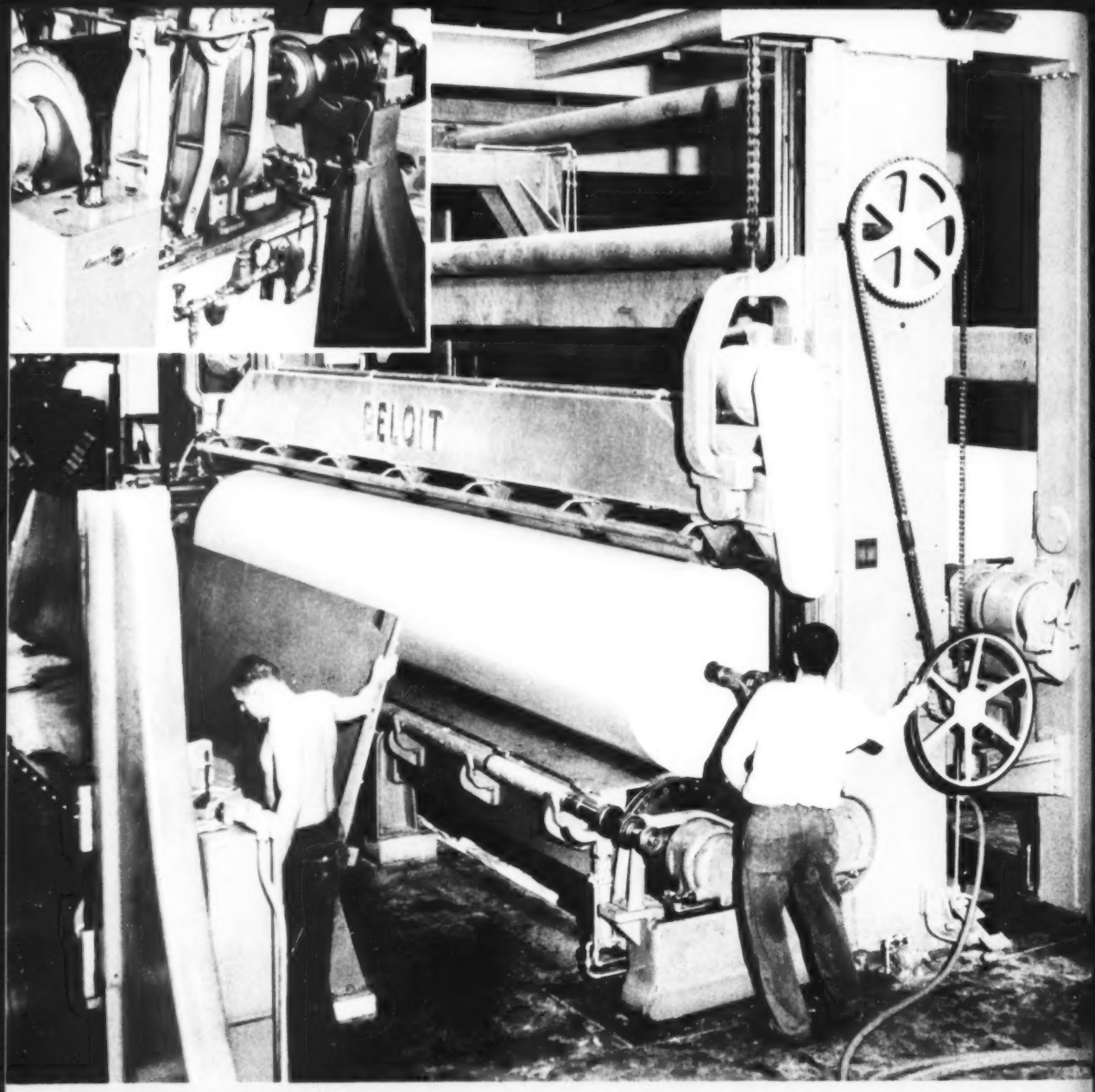

SIX THOUSAND FEET to stop in less than 40 seconds, and the newsprint sheet is still on the winder; no rethreading necessary before the next set.

The Beloit automatic tru-tension regulator *(inset)* makes such stops possible. Automatic tru-tension is one of the components of the Beloit-engineered high-speed winding system. The Beloit system permits single winders constantly to stay ahead of machines running at over 2000 fpm. Beloit automatic tru-tension regulator accurately measures tension in the sheet and adjusts the unwind stand brake, holding tension constant for winder sets of uniform hardness. Only one moving part is involved in this exclusive Beloit development. It is entirely unaffected by inertia or size of the "parent" reel, or by the rapid rate of deceleration in building a winder set. Inertia does not have to be compensated because the tension signal is derived pneumatically—directly from the sheet.

Beloit engineering integrates winder, tension control, slitting, and drive into a single system with unit responsibility.

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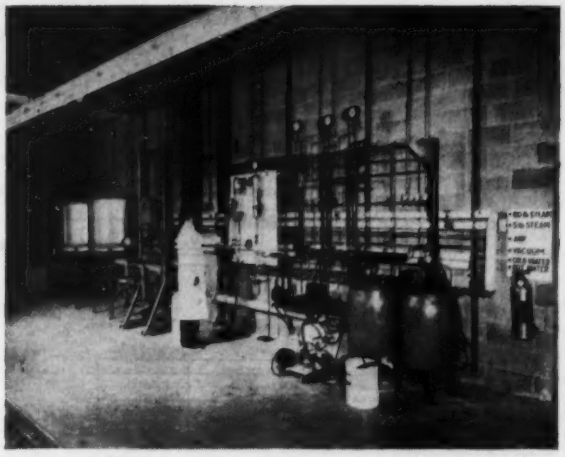
Now

New multimillion-dollar research center of Clinton Corn Processing Co. in Clinton, Iowa.



Modern pilot plant in the new research center tests laboratory-developed processes under plant conditions.

Clinton Corn Processing's new research center

CLINTON CORN Processing Co.'s new million-dollar research center was opened on June 21. The new center at Clinton, Iowa, will meet the needs of the 50-year old company in its development of better and more economical processes, improved corn products, new corn products and new applications of these products. Clinton Corn Processing, a division of Standard Brands Inc., now processes daily 60,000 bushels of corn, converting it into corn syrup, corn sugar, starches, corn oil and feedstuffs. The company, according to its president, R. C. Wagner, ranks third in the corn wet milling industry, its capacity approaching that of A. E. Staley Mfg. Co., which ranks second. Clinton's processing plant is managed by R. P. Jurgensen.

The starches, of course, constitute the company's products that are of vital importance to the paper and board industries. Current estimates show that close to a billion tons of starches are used annually by these industries. This includes some 800,000,000 tons of corn starch and 150,000,000 tons of potato and imported tapioca starches. The annual average rate of increased consumption of starches by the paper and board industries over the last decade has been about 10 per cent.

The first step in the processing of corn, called steeping, is actually a major fermentation operation. Here in large tanks corn is continuously undergoing treatment so that it will be conditioned for mechanical separation into its component parts. In the steeping process tremendous tonnages of lactic acid are formed, tons of protein are altered and solubilized, and many other chemical and physical changes are brought about. After mechanical separation of the carbohydrate material from the kernel, practically every step in processing this material involves chemical processes and methods.

Starches are modified by various chemical procedures. These processes include acid modifications, oxidation with sodium hypochlorite in alkaline solution, and dextrinization, which is a combination of hydrolysis and repolymerization.

Clinton Corn Processing uses large quantities of chemicals such as hydrochloric and sulfuric acid, lime, calcium carbonate, caustic soda, soda ash, chlorine, sulfur, etc.

Depending on the application and the grades and quality of paper produced, the paper and board industries use common starch, enzyme, converted starch, oxidized starch, acid-modified starches and dextrines for wet end application, tub-sizing, calender-sizing, and in coating applications. The recent demands for coated papers and the expansions of coating facilities in paper and board mills have opened a tremendous market for starches, and the new research laboratory is implementing research programs that will result in improved starch products for this application. It is felt by the research department that such improvements as greater adhesive strength, smoother printing surfaces on paper and greater resistance to moisture of the starch products are within forseeable reach.

Starch products are also used to prepare adhesives for the manufacture of laminated and corrugated board, paper tubes, containers, boxes, bags, envelopes, etc.

The new research center, which will be staffed by 60 scientists under the direction of George T. Peckham Jr., is fully equipped to handle all research problems in connection with syrup, sugar, starches, dextrines, milling, by-products and fermentation. A development laboratory or pilot plant will test processes that have shown promise in the test tube stage, secure engineering information for plant and equip-

(Continued on page 319)

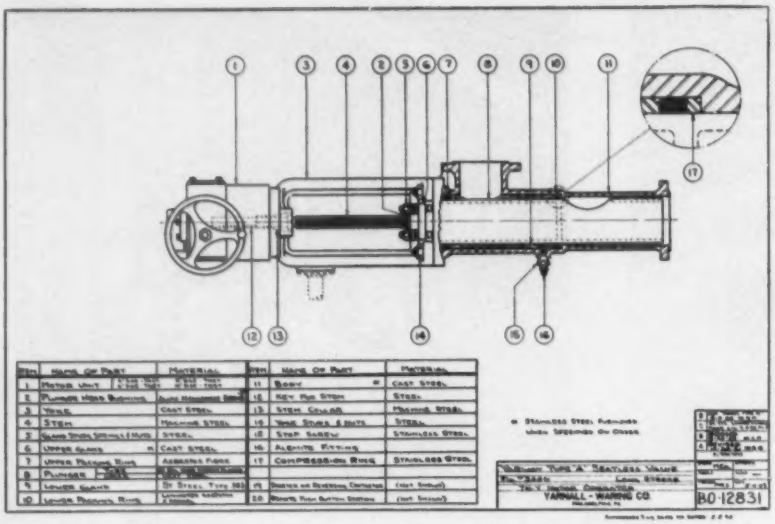


Fig. 1—Seatless valve. For sulfite cooks the valve should be made of all stainless steel, preferably the molybdenum-bearing type.

Design, operation and maintenance of digester blow valves*

FRANK PTACEK
Yarnall-Waring Co.

WITH THE ADVENT of larger digester sizes in the batch process, the importance of keeping them "on the line" has become most important. This means that all accessory equipment tied in with their operation has come under close scrutiny to make certain it renders full and satisfactory performance. One of these important auxiliaries is the blow valve.

Minimum basic requirements

1. Tight shut-off under full digester pressure to prevent both loss of cooking liquor and burnt chips.
2. Free discharge for fast, clean blows, assuring full production.
3. Low maintenance. Must be rugged to resist the erosive action of cooking liquors moving at high velocity, as well as shock and vibration.
4. Should be capable of "positive" rapid opening or closing, preferably by remote operation.

Various types of blow valves

Generally speaking, there are four basic types of blow valves:

1. Disc and seat type.
2. Plug type, where plug can be semi-spherical.
3. Venturi ball type.
4. Seatless sliding plunger.

The disc and seat type, of angle or straightway design, is usually made of stainless steel. In many instances it is furnished with an access door for inspection after a blow has been completed. Steam packing lends itself to easy adjustment. Pinion drive shaft can be driven from an air or electric motor.

Advantages claimed for a typical plug or modified spherical design are: (a) quick opening with full, unobstructed flow; (b) positive quarter turn opening and closing; (c) ease

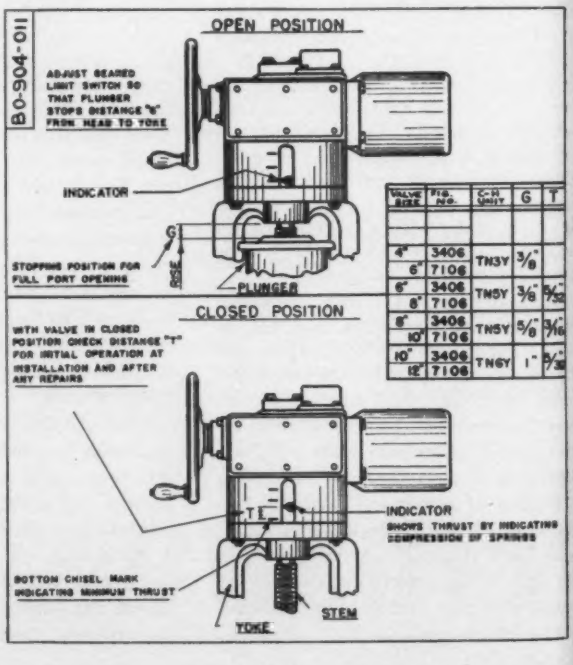

B0-904-011
OPEN POSITION
ADJUST GEARED LIMIT SWITCH SO THAT PLUNGER STOPS DISTANCE "G" FROM HEAD TO YOKE
INDICATOR
G
STOPPING POSITION FOR FULL PORT OPENING
BORE
PLUNGER
CLOSED POSITION
WITH VALVE IN CLOSED POSITION CHECK DISTANCE "T" FOR INITIAL OPERATION AT INSTALLATION AND AFTER ANY REPAIRS
T
INDICATOR
SHOWS THRUST BY INDICATING COMPRESSION OF SPRINGS
BOTTOM CHISEL MARK INDICATING MINIMUM THRUST
YOKE
STEM
VALVE SIZE | FIG. NO. | C-H UNIT | G | T
4" | 3406 | TN3Y | 3/8" |
6" | 7106 | | |
6" | 3406 | TN5Y | 3/8" | 5/32"
8" | 7106 | | |
8" | 3406 | TN5Y | 5/8" | 3/16"
10" | 7106 | | |
10" | 3406 | TN6Y | 1" | 5/32"
12" | 7106 | | |

Fig. 2—Indicator on motor unit shows thrust setting as indicated by compression of thrust springs.

*Paper presented at the fall meeting of the Superintendents Association's Northeastern Div., held September 20-22, 1956, at the Poland Spring House, Poland Spring, Maine.

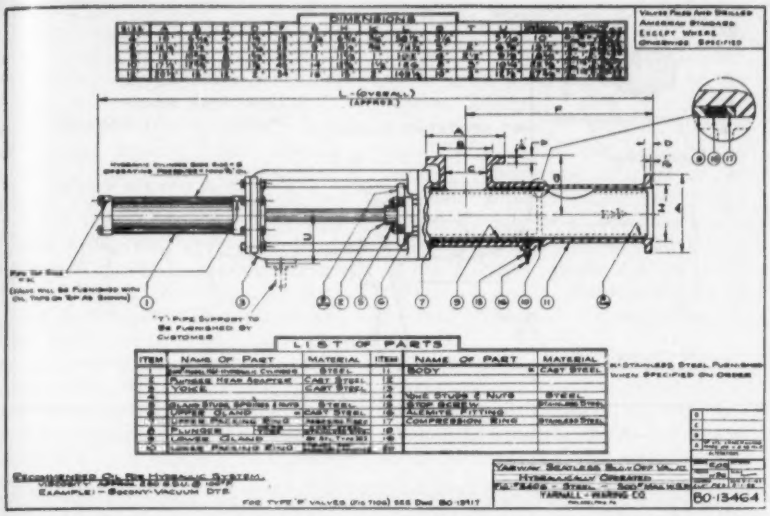


Fig. 3—Hydraulically-operated cylinder assembly to a blow valve. There are no threads subject to wear. Drop-tight valve closure is assured by pressure in cylinder for the closed-valve position.

of repairs; (d) wiping and cleaning effect from the ball rotary action, and (e) protection of machined surfaces during a blow. In the venturi ball type all parts are out of the stream, giving straight through, unobstructed flow with the yoke member rounding out the smooth venturi passage. Line contact with high unit pressure between ball and seat should assure drop tight, dead end shut-off.

The seatless sliding plunger valve is of the same basic design as a smaller-sized boiler blow-off valve. It is designed for tight shut-off under full digester pressure.

The minimum discharge area is ample (an 8-in. valve has an 8-in. discharge diameter), assuring fast clean blows. Its basic mode of operation — "pull" to open and "push" to close — lends itself well to remote power operation.

Materials

Materials are assuming more and more importance in view of the increasing severity of the process and the definitely increased costs of maintenance. Our past experience with cast iron has been unsatisfactory because of the temperature, shock and vibration inherent in blow valve usage. For either sulfate or sulfite cooks, bodies and internals of disc and venturi ball type valves are made of stainless steel. For sulfate cooks, spherical plug and seatless plunger types are made with carbon steel body and stainless trim. The plunger (the only moving part) in the latter is made of 17/4 PH stainless steel. This steel has a corrosion resistance approaching that of Type 304 stainless steel and is hardenable to 400 Brinell. It is hard chromium-plated. For sulfite cooks, the valves should be made of all stainless steel, preferably the molybdenum-bearing type. (Fig. 1).

Modes of operation

Not so many years ago, a good digester size was about 2000 cu. ft. For such a digester, a 4-in. (or 6-in.) full-ported valve was considered ample. But now, with capacity increased to approximately 4500 cu. ft., an 8-in. valve is practically mandatory for a fast blow (order of 10-15 min.). This large size valve, combined with the desire of mill management to get the "blow man" out of the blow pit to prevent accidents, has advanced the use of remotely-operated valves — both electric motor- and hydraulically-actuated.

All valves that have been described lend themselves to remote operation — both motor and hydraulic — to a greater or lesser degree. One word of caution: Where valves are power-operated from the loading platform (the usual location), they should be designed to show the operator whether the valve is open, shut, or "in between". This can be accomplished with a switch arrangement on the valve and a panel light, the latter directly in front of the operator.

In a typical motor-operated valve the rugged drive is practically completely enclosed, and the motor casing is made of Meehanite. The motor unit is a so-called controlled-thrust type, in which the closing force applied is controlled to a maximum value should tramp material, lodged in the valve, prevent closure. This maximum value is such that power is shut off before the valve is damaged.

An instruction sheet taken from a valve instruction manual is shown in Fig. 2. Indicator on motor unit shows thrust setting as indicated by compression of the thrust springs.

In recent years, the use of hydraulically-operated valves has in-

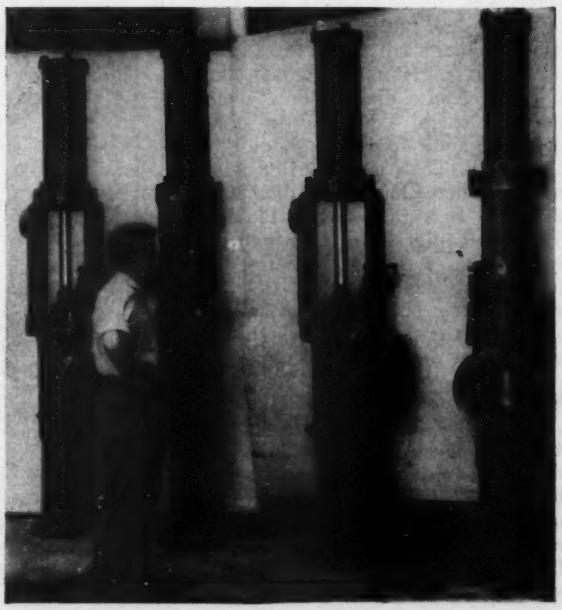


Fig. 4—Hydraulically-operated valves shipped to Dryden Paper Co. Ltd. These valves are equipped with a safety latch to prevent an accidental blow of the digester.

creased. One reason for this has been the development of reliable hydraulic circuits. This type of operation has lent itself to group operation.

Fig. 3 shows a hydraulically-operated cylinder assembly to a blow valve. Note that, in this mode of operation, there are no threads subject to wear. Pressure is kept in the cylinder for closed-valve position to assure "drop tight valve closure". The power unit, a high-pressure pump driven by a standard 2- to 3-hp motor, operates to maintain a pressure of approximately 800 psi at hydraulic cylinder; a pressure switch, which starts and stops the pump to maintain hydraulic pressure, and a pneumatic accumulator which helps to cushion shock and provides a practical working range speed control valve to adjust for a wide range of cylinder operating speeds.

The power unit is at any convenient level. The hydraulic valve (for opening or closing the blow valve) provides good remote control. A suggested (field tested) arrangement uses two power units for up to 10 digester valves. These units are interconnected by shut-off valves for operation in case of emergency or during period of repair of one power unit. Fig. 4 shows four of these hydraulically-operated valves prior to shipment to Dryden Paper Co. Ltd. Dryden, Ont. Note installation of a safety latch to prevent accidental blow of the digester.

Valve discharge areas

Until recently, the size of a blow valve was determined by the size of the digester outlet flange. At present, another criterion has been used: that is, "How long will it take to blow clean a digester of a given size?" General consensus is that complete time for blow should be 10-15 min. Thus, a full-ported 8-in. valve (where minimum discharge diameter is 8 in.) should blow a 3500-cu. ft. digester in approximately 10 min., a 5000-cu. ft. digester in approximately 15 min. In considering any make of blow valve, ascertain the minimum discharge diameter or area.

Lubrication of blow valves

Regardless of the type of blow valve specified, all types to some degree require periodic lubrication to assure long life. In discussing the obvious advantages of remote operation — including elimination of the blow man, — the question of who should lubricate the valves, and when, always has arisen. A valve is best lubricated in the process of opening or closing, which would require that personnel be available at that particular time when a digester is blown.

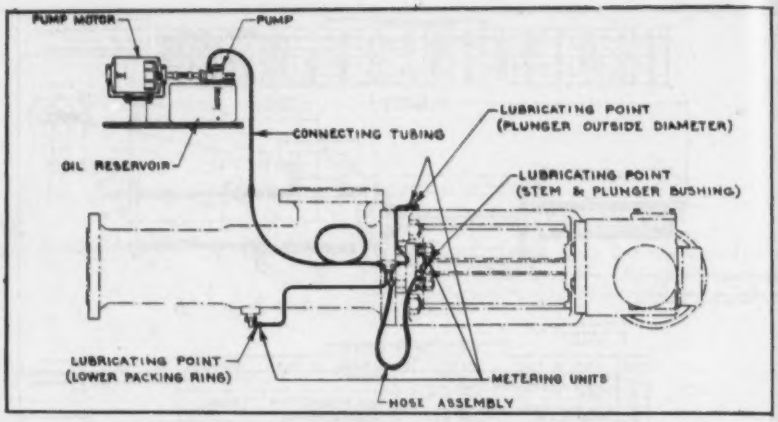


Fig. 5—A fully automatic lubricator for a single electrically-operated valve.

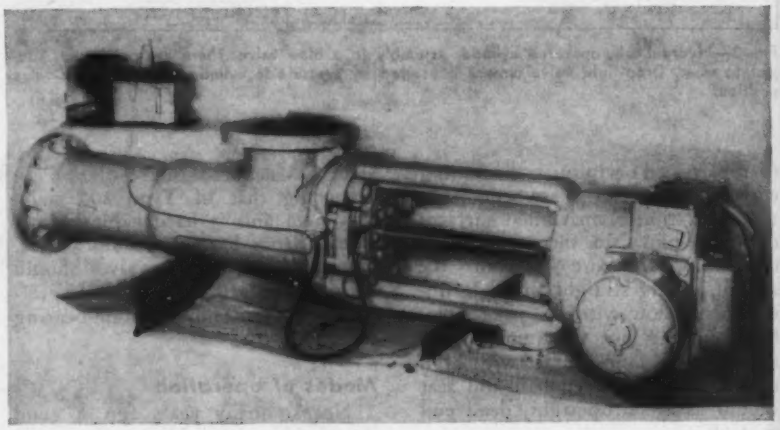


Fig. 6—Valve equipped with a fully-automatic lubricator.

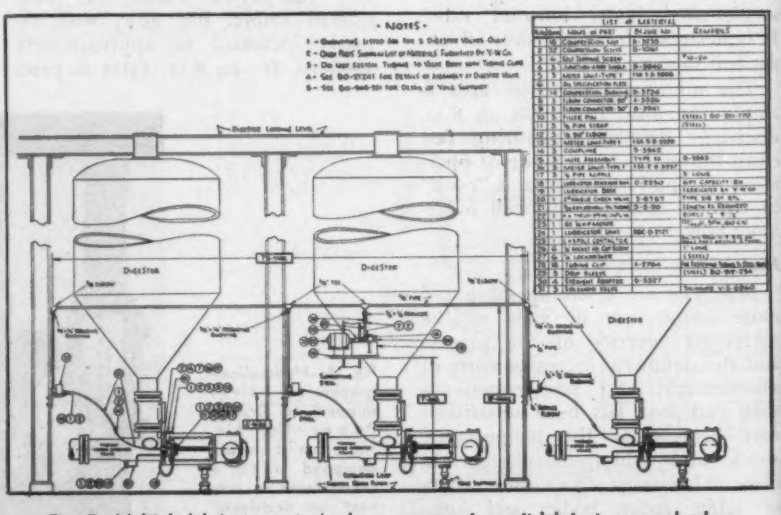


Fig. 7—Multiple-lubricator system, where one pumping unit lubricates several valves.

A fully-automatic lubricator for a single electrically-operated valve is shown schematically in Fig. 5. The lubrication system is activated from the pushbutton station controlling the valve operator. The illustration

shows a single lubricator designed to lubricate one valve. Note that a motor drives a positive displacement pump. When the motor is energized, lubrication flows to three points — outside diameter of plunger, stem and plunger bushing; and through stop screw fitting to lower packing ring, and to lower portion of plunger. Valve operators are usually 440 or 550 volts, 600 cycles, 3-phase. The pump motor is usually of the same current characteristics. In wiring, the pump relay coil is placed between the valve-reversing contactor and the operator, so that the coil will be energized when valve is either open (for blowing) or closed (at completion of blow). Pump motor is running only during this short period. A valve, equipped with this lubricator, is shown in Fig. 6. This is a photograph of one of our valves taken in our shop before shipment to the field.

In a good many instances, it is possible to use a multiple lubricator, a design where one pumping unit lubricates several valves, the limiting factor being length of lubricating lines. This design is shown in Fig. 7. Where a group of three (or possibly four) of these electrically-operated valves are used, the multiple lubricator may be used. This is predicated on relatively close spacing of the digesters and the fact that only one digester is blown at any given time. A solennoid-operated hydraulic valve in oil feed line is used to lubricate the particular digester valve being blown. This oil is conserved, and digester floor remains safe and clean.

Where the valve is hydraulic cylinder-operated, a "one-shot" semi-automatic lubricator has been developed to lubricate the two points — plunger outside diameter and lower packing ring. Since the piston rod is self-lubricated, there is no need for additional lubrications. Thus, in a typical sequence, the operator lifts the handle of the lubricator, cocking it; he opens the digester valve, and lubrication proceeds as Metered lubrication proceeds. At completion of blow, he again cocks the lubricator, closes the digester valve, and lubrication proceeds as the valve closes.

Care and maintenance of blow valves

Basically, well-designed blow valves, with intelligent choice of materials, require little operating care other than routine inspection and minor adjustments. Where packing (e.g. stem) is used, and not subject to the lubricating properties of the liquor, it should be replaced about once a year. This insures a correctly operating (tight) valve at all times. In the case of the seatless plunger valve, where the packing is always "wetted" by the liquor, a period of two years before packing replacement is made is not unusual. Where mating parts are threaded (e.g. stem and bushing), and these parts operate under momentary heavy loads (as in final closure of valve), check annually to prevent accidental stripping of worn threads.

Some mills, from safety viewpoint, remove every digester blow valve at approximately two-year intervals for measurement of body shell thickness. Critical walls are inlet and discharge ends of the body. The strength of the chemicals used in the cooking operation appreciably affects life of digester shell as well as blow valve components.

Many mills keep a complete spare blow valve and a few spare parts on hand for insurance of full-time blow valve performance. The spare valve is put into service while other valve goes to shop for repairs, preventing loss of valuable digester production time. As to spare parts, be guided by the manufacturer of your blow valve. Based on extended experience, he knows just what parts are expendable as well as their average life.

In the case of the seatless plunger valves, packing should be carried in stock. Where valve is electrically-operated, one plunger head bushing per mill is good insurance.

The modern digester blow valve is a far cry from that furnished some 15 to 20 years ago. The basic design features have furnished a good deal of experience to the field. This, combined with superior materials and accessory equipment (e.g. lubricator), can and does result in improved valve performance. Valve manufacturers intend to continue their engineering and research to keep the trend in this same direction.

Chemicals in Debarking

(Continued from page 310)

it may attract wild or domestic animals.

In spite of the favorable results obtained with arsenic, however, a note of caution must be sounded. In addition to the extremely serious effects of arsenic taken internally, painful skin rashes may develop when arsenicals are handled or when the dust is inhaled.

Secondly, there is the danger to wild animals in the bush and to domestic animals if the work is carried out close to habitation. With proper precautions, however, the use of treating chemicals does not endanger wild or domestic animals. In the first place, there is a rapid movement of the chemical from the girdle face after treatment, with most of the arsenite disappearing in 48 hours. Furthermore, the addition of a repellent, such as pentachlorphenol, styrenedibromide, creosote, cresylic, etc., will discourage most animals from licking the girdled areas.

In view of these objections, there is always the hope that some less toxic chemical will be found to replace the arsenites. There is a certain stigma attached to arsenic. A manufacturer of food board or butter wrap or milk bottle stock would have to convince his customers that there is no carry-over of arsenic into the finished product. Actually, the chemical does not remain in the pulp made from trees treated with arsenic. The results of analysis of such pulps show an arsenic content which is less than the maximum tolerated in food products.

The market potential

What is the market potential for chemicals used in tree barking? An average size pulp mill will consume annually about 1,000,000 trees. Assuming that one half ounce of the chemical is required to kill a tree, we find that about 15 tons of the chemical would be required annually to debark the wood used by one mill.

While it is not likely that all pulp mills will adopt the chemical debarking method, or that any one mill would debark all of its trees chemically, the market potential for debarking chemicals nevertheless remains a substantial one.

Clinton Corn

(Continued from page 315)

ment design and produce experimental products for commercial evaluation.

The new laboratory also houses the technical sales service staff, under the direction of Dr. John M. Newton, whose duty it will be to demonstrate the company's products in customers' factories, feed ideas to the research department, evaluate experimental products, introduce new products to customers and serve generally as trouble-shooters for customers in all industries.

The impact of packaging on the paper industry

JOHN B. CALKIN and JOHN L. PARSONS

Calkin & Bayley Inc.
New York, N. Y.

Part III — Packaging machinery; trends in packaging.

IN RECENT years greater versatility has been engineered into packaging machinery. For instance, the packager is now able to obtain equipment that will fabricate paper boxes wholly or in part, including gluing, feeding, wrapping and delivery to conveyors. The packaging industry, through equipment manufacturers, is endeavoring to increase productivity and compensate for rising labor and materials costs. Not only are new machines being developed for greater speed and efficiency in packaging, but also new containers to simplify the job are being created. In fact, the processor of bulk materials is today faced with so many developments in packaging that it is difficult for him to keep up with them. Fortunately there are many sources of information at his disposal, such as the National Packaging Exposition and published articles on the subject.

The types of equipment available for the packaging industry include machinery for forming or making (1) paperboard folding boxes, (2) paperboard set-up (rigid) boxes, (3) corrugated shipping containers, (4) fiber cans, (5) paper bottles, (6) flexible packages, including paper bags of all types, envelopes and packets and (7) coatings and laminated products on paper as a substrate or foundation.

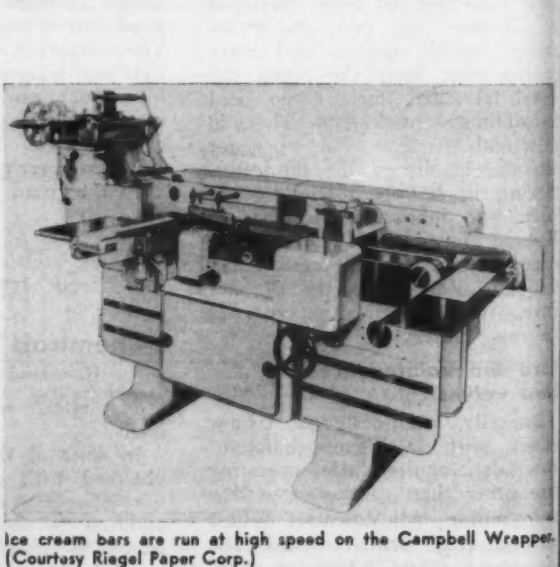
Trends in packaging

According to a recent survey made by the Stanford Research Institute on the long-range outlook for shipping materials, the business in the corrugated container field will double within the next 20 years. The same is predicted for the use of multiwall sacks. The demand for fiber drums will increase five-fold by 1975. Also, the projected requirements for paperboard will approximately double in 20 years. These predictions are indications of the continued tremendous demand for paper to be used for packaging purposes. The National Retail Dry Goods Association has stated that from present indications the time is not far off when the typical store will have few counters at which customer and salespeople will meet. Retailing is currently entering a dramatic period of development characterized by prepackaged selling. In other words, packaging and the printed word are replacing the salesman.

In industrial packaging, as well as in other areas, there is a significant trend towards paper materials and paper containers replacing metal and wood. Paper with improved properties, such as wet-strength, and in combination with anti-mold compounds, volatile corrosion inhibitors, antitarnish agents, plastics of different types, metallic foils and other substances, has become an exceedingly versatile and adaptable material for an increasing number of packaging purposes.

The most obvious trend in shipping containers is toward corrugated boxes for jobs heretofore considered impractical. The box manufacturers are continually meeting the challenge for more and better containers. Water-

Glassine-lined food packages are automatically formed by a Pneumatic Scale Double Package Maker. (Courtesy Riegel Paper Corp.)



Ice cream bars are run at high speed on the Campbell Wrapper. (Courtesy Riegel Paper Corp.)

Open-mouth bags are filled and accurately weighed by the I. & C. bagger. (Courtesy Union Bag-Camp Paper Corp.)

repellent containers, reinforced with fiberglass, are now replacing canvas bags for ocean-going mail shipments to Alaska. The containers weigh only 15 oz., carry 75 lb. of mail, cost 31 cents each and may be expendable after a one-way trip.

A $120,000,000 market potential for folding boxes by 1960 in the prepackaging of fresh products is indicated by a study just completed by the Folding Box Association. This report states that in the produce field demand for packaging will double in the next four years, that by 1960 half of all fresh fruits and vegetables sold in the U. S. will go to consumers in boxes. This is a healthy boost from the 5 per cent packaged in 1950 and today's figure of 20 per cent.

Machinery paces the major advances in packaging, and developments in equipment must keep up with the demands made by materials and packages. The effects of automation will be increasingly felt as attempts are made to increase speed in package production, as well as in filling the containers to compensate for rising costs of labor and material.

The carry-carton is invading new product fields, and the increasing use of easy-open containers, both for the retailer and the consumer, indicate that convenience is becoming a requisite for many packages. There is hope for universal barrier materials, eliminating the multiplicity of grades, classes and types now used. The demand exists for light-weight, rigid containers constructed of non-critical materials. The greatest advance in 30 years in the shipping of clothes is the expendable container for handling men's coats ready for the customer. The growth of pre-packaging has advanced fruits and vegetables to the status of major packaged commodities. The Department of Agriculture estimates that 15 per cent of the 75 billion lb. of produce grown annually is now bagged, boxed, over-wrapped, tagged, labelled or otherwise conveyed to the consumer. Paper is important to these operations. The prediction is that within 10 years 75 per cent of all fresh fruits and vegetables will be prepackaged at the grower, terminal or retail level.

To keep pace with the population growth in the Chicago area alone, it is predicted that 400 additional supermarkets will be needed within 10 years, signalling an increasing demand for paper packaging, coated paper and display papers. "Packaging is the backbone of supermarket selling, and an essential part of the advertising and selling program of every manufacturer and retailer."

The growth of the fiber drum industry, which produced over 26,000,000 units in 1955, is expected to follow the general industrial requirements for bulk containers. More fiber cans and tubes will be used by the larger packagers of consumer and shelf-items to reduce cost and compete with tin and glass. The trend in self-service reflects the increased usage of folding cartons for many goods.

The future of the dairy industry depends on the packaging of its products to meet the competition of other food items. In order to retard the declining per capita consumption of butter more attention has recently been given to the color illustrations on the butter carton.

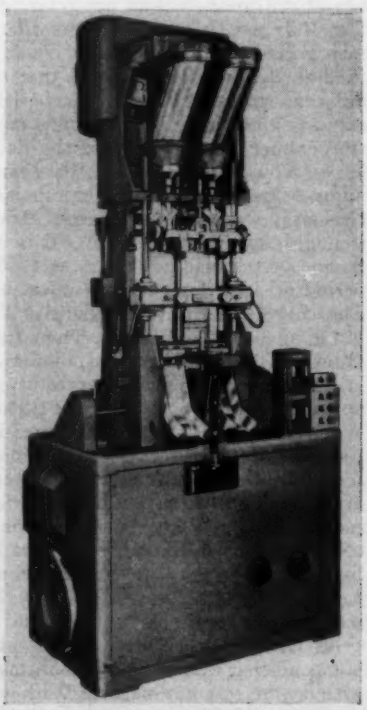
The American public is becoming more and more conscious of the use of paper napkins; consumption has doubled since 1940, and increased 15 times since 1925. An estimated production of nearly 1,700,000 tons of tissue in 1955 reflects a gain of about 7 per cent compared to 1954. Packaging has become an important item in the merchandising of many grades of tissue. The growth pattern of the tissue industry is ahead of the normal increase due to increased population.

The increased emphasis on packaging research is demonstrated by the new courses of packaging instruction by Columbia, New York University, Stevens Institute of Technology and other educational institutions. There is increasing interest in the growing activities of packaging associations and groups, as evidenced by the attendance at their meetings and packaging symposia. The growing pattern of the National Packaging Exposition testifies to the need of American industry for a market place. Over a period of 25 years the number of exhibitors has grown from 34 to 380, and the attendance has increased from 2,000 to 31,000.

The contribution of packaging to the national prosperity is tremendous, as so many industries are affected. A good share of the credit for the increased consumption of tea in the United States must go to the use of the tea bag. About one-half of the total tea sales is now in bag form. Many of the 40,000 items in the new self-service 5-and-10 stores are packaged, and paper is important to many of these items.

At the present time there is a definite trend in the paper industry towards integration from log to finished product — one-firm ownership. In order to operate at full capacity, kraft paper manufacturers are seeking to buy out their customers, the converters. In that manner a market is assured for their products. Other objectives of integrating these operations are to reduce costs and improve quality.

This article as published in Parts I, II and III is based on a paper. "Basic Material Takes on New Properties for Packaging Jobs", which appeared in PACKAGING SERVES THE NATION (American Management Association, 1956).



Packages of the "pillow" type are filled and sealed by the Stokeswrap machine. (Courtesy Riegel Paper Corp.)

Pulp washing — a panel discussion

Moderator: Harry E. Weston, American Pulp & Paper Mill Superintendents Association

Panel Members: C. K. Textor, The Bauer Bros. Co.; H. K. Waters, Swenson Evaporator Co.; Ward Pitkin, Dorr-Oliver Inc. (substituting for Thomas B. Calhoun of Dorr-Oliver); Bruce Armstrong of Appleton, Wis.; C. W. Converse, Sprout, Waldron & Co. Inc., and Edwin Kemp of Bauer Bros.

THE FOLLOWING is a continuation of a transcript of the discussion of pulp washing held December 4, 1956, as part of the Fifth Annual Pulp and Paper Conference at the University of Florida, Gainesville. For purposes of better continuity, the questions and answers have been regrouped, insofar as possible, under definite subject headings.

Retention time and consistency

Q. (Mr. Dedert) I would like to ask another question about this 20 min. retention time that Mr. Armstrong said seemed to be indicated and worth while. He did not mention at what consistency that rentention should take place. I think he was talking originally about screw presses, but he ended up his comment referring to the 20 min. for vacuum washers. We would only have two choices. We would either have that retention time at, let us say, 15 per cent consistency or 18 per cent at which we discharge, or we could dilute down towards the value of 1¼ that we have in our vats. If we go all the way to 1¼, 20 min. retention will require a tank some six times as large as our blow tanks. It is an extremely large tank. I would like to have it clarified as to what consistency it is advocated that this retention take place.

A. (Mr. Armstrong) Can you all see this curve on the blackboard? This was done by taking a sample of pulp out of the press. It does not refer to the vacuum washing. It is strictly on press operation. That sample was then mixed with an analyzed amount of black liquor to simulate what had entered that stage. After several different retention times, it was pressed in the laboratory and then analyzed. The pulp was held at a constant temperature of 145°F. From the data, we evolved this curve. You will see that we have the retention time in minutes as abscissa; and, correspondingly, on the vertical axis we have the degrees Baumé of liquor at a standard temperature of 60°. This shows the value of Baumé of press liquor taken at 1-min. intervals over a period of something like 28 mins. total retention time. The curve starts up very sharply. Tests are run in the range of 3 or 4 min. time. The curve is changing very rapidly. The commercial installation is, as I said, being made. We will have an opportunity to check this curve on a commercial scale of over 300 tons per day rate. We will have more reliable figures on that in the near future. From this curve, determined on a laboratory scale, we arrived at a minimum of 10-20 mins. We allowed 20 mins. in all to have ample time for commercial rather than laboratory control. You can get excellent control in the laboratory on a very small sample that you cannot approach in the mill. On the other hand, you cannot use an absurdly large tank between stages either.

As Dr. Nolan pointed out, in press work, we have one condition that you do not normally have to contend with in the vacuum washer. With vacuum washers operating at 16-20 per cent consistency, you still have a small amount at least of free water, superficial water, on the outside of the fibers. In the press that is practically non-existant—or it is so small that it is academic. The pressures on washers are not high enough to remove the water out of the hollow lumen of the fiber itself. No doubt you get a condition in press operation that does not exist in the vacuum washer—this rapid blotting effect, the minute you add water to it. I think in one of the talks one of the other gentlemen mentioned the fact that they added 1 lb. of dilution water as dilution to their stock and then pressed it in the second stage. Was that you, Bill Converse? How do you get uniform distribution of that wash liquor when it is only 1 lb. of wash liquor per pound of pulp? It would seem to be a major problem. With the screw press when you have pressed liquor out of the hollow lumens, when the wash water strikes this pressed pulp, it is absorbed almost instantly by capillary action. I think there is a distinct difference in the mechanics of the two pieces of equipment. It is about the only important difference that I know of. I hope this will help clear up some of the misunderstandings on it. I also hope that, in the near future, we will be able to collect from the various mills more data of this kind. We can theorize and very easily come up with a lot of wrong answers. We would like to get the first-hand information right out of the mill. It has to come from you men.

(Mr. Dozier) I was just going to make a comment to the effect that the curve Mr. Armstrong has drawn on the board is just about exactly what we found. In the first 2 or 3 min. our total solids in the liquor went up very high, then levelled off. We settled on approximately 3 min. retention time as a compromise between efficiency and space; but, as I said, in actual practice when we got the retention time in and running we could not measure any difference in washing with the retention in there or not in there.

(Mr. Armstrong) This test was made on high-yield kraft. It would not necessarily hold or be valid on another type cook—say a low permanganate bleaching grade of kraft. On semichemical you would expect an entirely different curve. It will be similar, but it will undoubtedly be different. There aren't enough data to conclusively answer any of these things. You men have the opportunity in the field to collect some of these data. It will take some time, but someone should undertake to collect them. Perhaps at the next meeting we can bring some actual field data; then try to reconcile them knowing the type of pulp, the operating conditions and the very important variable of temperature. In most of these talks we have tried to abbreviate and keep down to a reasonable length of time. But, these discussions are the valuable part—where questions come up. There is a wealth of information available if it can all be collected in one place. Then, we can sit down together and try to analyze it and get a rational picture from it. There are far too few data yet to reach definite conclusions.

Q. (Dr. Nolan) Maybe this question was answered while I was roaming around on microphone troubles. Bruce, will you tell me what is the consistency you recommend in these retention tanks between filters?

A. (Mr. Armstrong) That is a difficult one to answer specifically. I am inclined to think that, if this storage vessel between stages were built like a small blow tank, you would have the ideal situation—where you would keep the pulps submerged and have very little danger of producing foam or air entrainment. The first requisite in any given case would be to run tests similar to the curve that I showed here. That curve is, we believe, quite valid for the particular pulp that we tested. Another mill might have an entirely different type curve. That would be the first step—to go into the laboratory and determine just what time that particular pulp would require and make your tank accordingly.

(Dr. Nolan) In other words, you would actually run an economic balance on the size of your tank versus the advantages of retention time.

(Mr. Armstrong) That is right. You don't want to spend money unless you get some gain out of spending it.

Q. (Dr. Nolan) And probably, as a rough guess, instead of doing your storage at 1¼ per cent you are probably up to somewhere between 5 and 10 undoubtedly, aren't you?

A. (Mr. Armstrong) I think it would depend on whether you are using a vacuum washer or a press on it. With the press, you would be inclined to go around 4 or 5 per cent and on the vacuum washer perhaps 3 per cent. You have another balance—to take the size of the pipeline to convey that quantity of pulp, the size of the tank and the motor to drive it, etc. Those are all factors that have to be considered pretty carefully, not only on first costs but on operating costs. Pumping at low consistency can run large volumes of water and takes a surprising amount of horsepower to handle it. You would want to keep that as low as you could without running into some other troubles on the other side.

Q. (Dr. Nolan) If you are running a vacuum washer, you would do your storage at one consistency, then do your final dilution for sheet pick-up just before you put it on the wire?

A. (Mr. Armstrong) That is the customary way of doing it. Otherwise, you would be pumping an excessive quantity of water and getting no particular gain out of it.

High-yield refined pulp washing

Q. (Mr. Shealy) We have been talking about screw presses and vacuum washers. I wonder if there is anyone here that has any information or comments to make on high-yield refined pulp washing on the valveless washer? In other words, do you know what could be expected from a valveless washer in the brown stock washing system?

A. (Mr. Armstrong) I can make just one comment along those lines. We have had some experience on high-yield washing, which is recognized as one of the more difficult ones. In the refining two things are prone to happen. You invariably have some freeness drop. You try to keep that as small as possible; but, it is inevitable that there will be some drop. The capacity of either a vacuum-type washer or a press will drop off with that freeness if it is appreciable. So, we are inclined to agree with the comments that Bill Converse made. I think he has a very valid idea there in trying to wash and refine the chips simultaneously because you avoid that problem there. It can be serious. I was in a mill up in Canada fairly recently where they were not able to pick up the sheet at all on the vacuum washer but had no trouble handling it on the press. The press does, however, suffer rather severely with a drop in capacity from a drop in freeness.

(Mr. Pitkin) We don't have a great deal of experience on valveless washers, but we have been observing their operation for a number of years. It is our opinion that they operate best on a particularly free pulp, such as a hard liner pulp that has not been hot refined. We would hestiate to recommend valveless washers on hot refined kraft or on other pulps where there was a reduction in the freeness.

(Mr. Shealy) I might make a remark here for anyone that is interested. It cereainly is a problem when you are refining high-yield pulp. Drainage rate is a controlling factor. We had to design our own drainage tester before we could even get a sheet across the washers. We control our cooking with chlorine number rather than pramangate number, but drainage rate becomes the controlling factor in washing. For high production rates we have to keep our drainage rate within certain limits—otherwise, we either just don't get the stock across the washers or we don't get the wash job that we should get. Therefore, drainage rate is the method that we use for control. If we are on a low production rate, we can drop our drainage and decrease our rejects. We do more refining at lower rates than at higher rates. I just wondered if there was anyone else here that had vacuum washers in their brown stock washing system that might have some comment.

(C. W. Converse, Sprout, Waldron & Co. Inc.) The problems of washing high-yield kraft pulp and of refining it seem to be bound up together. While we manufacture the refiners, we still have to suffer along with the washer fellows and they vice versa with us. My impression is that the problems in washing hot refined kraft are so great that the tendency is towards cold refining after washing. I know of one mill in Canada where they have gone back and forth between hot refining and cold refining. They have, I think, twice tried each type of refining and finally now settled on cold refining as meeting their mill needs best. It does take a little more power. Let us say, percentagewise, it may take 1/3, 30 per cent more power to refine cold refined high-yield washed stock; but, actually, on a horse power basis, that is not too bad since you are only putting in about two horsepower days per ton for hot refining. At least, that is our experience. So, if you put in 3 or 3 1/2 hp. for cold refining it is not an insupportable burden. The question of what happens to the stock in hot refining that makes it wash very hard is something on which there has been a lot of speculation. My personal explanation, and it could easily be destroyed (but it does seem to fit the facts), is this: Even if there is no appreciable freeness drop, or if it is only 10 cc., the washing operation is still affected profoundly. Therefore, it must be something besides freeness which is contributing to the difficulty. I beleive that those fibers coming from the digester, still fairly well encrustated with lignin, are quite stiff, and they make an open felt on the washer. Put them through any type of refining device and the great amount of hydraulic action in their flexure and other mechanical action flexibilizes those fibers. I believe they become limp, and when they then form a sheet on the washer they form a really solid sheet through which you cannot force liquid. I don't know whether that is the explanation, but it certainly would fit the facts. The result is that the industry trend is towards cold refining. A very good example of that is Southern Paper Board Corp. at Port Wentworth.

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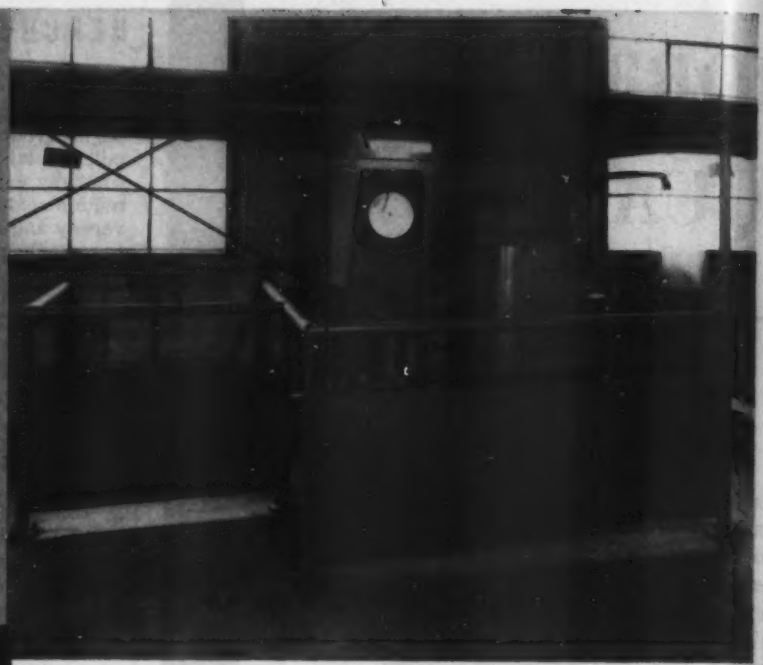

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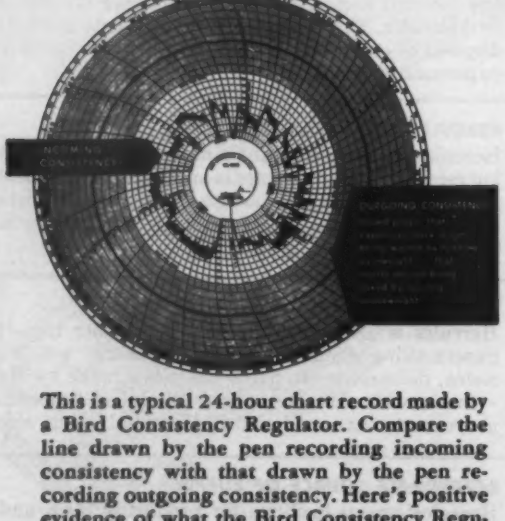

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CURRENT COMMENTS

Canadian newsprint: plays dead no longer . . . and cost-price squeeze

by WARREN B. BULLOCK

The Canadian newsprint industry, as represented by a newly formed group of its most important producers, has decided that it will no longer roll over and play dead under the sniping of politicians on the United States side of the border. Phrased in more diplomatic language, the Canadian group, known as the Newsprint Information Committee, has announced its program as being the promotion of "better understanding of the industry's problems and progress" in meeting United States newsprint needs.

The committee's first formal pronouncement was made in answer to a statement by Cranston Williams, general manager of the American Newspaper Publishers Association, in an appearance before the House Commerce Committee. Williams had told the Congressmen that newsprint supply would remain tight for some time to come, and that Canada was not doing its share to develop new capacity to meet the increasing needs of United States newspapers. The Newsprint Information Committee immediately issued a news release stating that the industry is now producing at less than capacity, and that instead of a shortage the stocks of newsprint on hand with the publishers or in transit at the end of April represented an average of 47 days' supply, as compared with a 26-day supply a year ago.

In the heart of New York

The Newsprint Infomation Committee was formed by the following leading Canadian companies: Abitibi, Anglo-Canadian, Anglo-Newfoundland, Canada Paper and Powell River. Harold S. Foley, chairman of Powell River, is chairman of the committee, and offices have already been opened in the heart of New York City.

The work of the new committee came prominently to the fore when the Congressionl Commerce Committee began hearings as part of an investigation of the demands by the domestic newspaper publishers for more production to meet expanding needs.

The Canadians have no opportunity to appear before Congress in defense of their position. but are ready to take their story to the public through other media. As a prominent Canadian executive said, American industry would resent a comparable step by the Canadian Parliament to investigate United States industries that ship merchandise into Canada.

The story of the newly drawn battle lines began when the Newsprint Information Committee issued its first announcement of its purposes through Chairman Foley, who said: "These companies believe it is important to make known on a continuing basis the facts about the environment of this key industry and the manner in which it is meeting its responsibilities. A parallel objective will be to increase public appreciation of the problems and progress of the newsprint industry's prime consumer, the newspaper publishing business — a dynamic and growing business that has consistently met the challenge of competing media."

Dragging its feet

The next development was the appearance of Williams before the Congressional committee, when he complained that Canada was dragging its feet in meeting the increasing demand for newsprint, and that from 1950 to 1956, Canadian plants added only slightly over 1,000,000 tons of capacity — and that almost all by speed-up of existing facilities. He said there was no sign that the current shortage would be relieved in the foreseeable future, and that there might be times of distress again. He said there was a fair chance that the Canadian and U.S. newsprint industry would be forced to operate above rated capacity for the 10th year in succession.

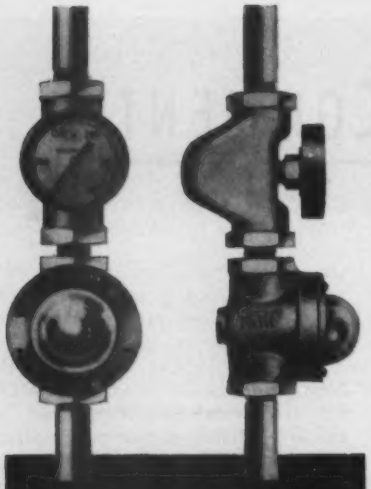
To this formal testimony the Newsprint Information Committee retorted with the comparison of stocks on hand in newspaper plants this year as compared with last year. The Canadian group estimated that the industry would continue to operate at less than rated capacity for the balance of 1957 and still meet newspaper requirements.

Two side comments were made before the Congressional committee outside the arguments as to the availability of sufficient producing capacity. Mr. Williams asked that Congress reduce the minimum width of paper to be admitted duty-free to rolls of 14 in. instead of the present 15 in. because of the manner in which the paper shortage has forced newspapers to cut the size of their printed pages. Originally, the legal minimum was 16 in. but was reduced to 15 in. by special act of Congress, and the publishers now request a further reduction. The representative of a group of negro publishers said that the situation was so serious that Congress should grant a subsidy to allow their publications to survive.

Production up . . . and down

Statistics bearing on the question of newsprint shortage show that production and shipments of newsprint in North America during April amounted to 717,253 tons, an all-time high record for that month. United States production, a record 635,191 tons through the first four months of the year, was 14 per cent above the same months of 1956; and Canadian output also reached a new high, 4.6 per cent above the corresponding period in 1956. There is nothing in any of the figures produced by the Canadian manufacturers, or even by the newspaper publishers, to controvert the survey of the newsprint situation published in THE PAPER INDUSTRY in December, 1956.

Except in the newsprint field, the production of paper and paperboard in the United States in the first quarter of 1957 was 3.6 per cent



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Current Comments . . .

below the 1956 level, according to Census Bureau figures, largely due to a 5.1-per cent drop in paperboard, while newsprint output and machine-coated paper output increased 11.2 per cent.

Trends in the paper industry show an effort by producers to overcome the cost-price squeeze that was shown in so many financial reports for the first quarter, when larger sales were often counterbalanced by smaller net earnings. Price increases in various fields have been reported. In the printing paper field some mills have increased their quotations $10 per ton, and in the fine paper area some increases were as high as $15 per ton. These are merely straws in the wind, despite the somewhat smaller first quarter demand as reflected by production statistics.

Financial Reports

Paper mill securities began to work out of the doldrums during the first few days of June. This was accompanied by an improved sentiment in the securities market as a whole.

Net Income

Allied Paper Corp.—Net earnings for the first quarter of 1957 were $856,016, as compared with $811,072 in the same quarter of 1956.

Crown Zellerbach Corp.—Net income for the first quarter was $9,459,000, as compared with $12,213,000 for the same quarter of 1956.

Dixie Cup Co.—Net income for the March quarter was $919,783, as compared with $823,035 a year ago.

Eastern Corp.—Net first quarter income was $328,069, as against $409,340 a year ago.

Fibreboard Paper Products Corp.—Net income for the March quarter was $975,190, as compared with $1,053,408 a year ago.

Great Northern Paper Co.—Net income for 12 weeks ended March 24 was $1,156,509, as compared with $1,344,323 in the comparable period in 1956.

Hammermill Paper Co.—Net income for 13 weeks ended March 31 was $753,533, as compared with $769,505 a year ago.

Hudson Pulp & Paper Corp.—Net income for six months ended Feb. 26 was $1,586,259, as compared with $1,621,278 for the comparable period a year ago.

KVP Co.—Net income for the March quarter was $711,826, as compared with $1,000,485 a year ago.

Keyes Fibre Co.—Net profit for the March quarter was $329,678, as compared with $303,815 a year previous.

Marathon Corp.—Net income for the six months ended April 30 was $3,009,691, as compared with $3,703,912 for the comparable period a year ago. Sales, however, increased to $74,282,234 from the $70,403,874 of 1956.

Mead Corp.—Net earnings for the 12 weeks ended March 24 were $2,787,774, as compared with $2,749,246 for the comparable period a year ago. Net sales, however, increased about $2,000,000.

Minnesota & Ontario Paper Co.—Net income for the March quarter was $1,441,504, as compared with $2,042,143 in the same quarter of 1956. At the same time sales increased a quarter of a million dollars.

National Vulcanized Fibre Co.—In the March quarter net income was $203,303, as compared with $524,304 a year ago.

Nekoosa-Edwards Paper Co.—Net income for the March quarter was $975,221, as compared with $1,107,809 a year ago, although the volume of sales was practically identical.

Scott Paper Co.—Sales in the first quarter rose from $51,742,225 in 1956 to $54,773,302 in 1957, but net income declined from $5,311,587 to $5,179,144.

Stock and Bond Quotations

New York Stock Exchange — Stocks

Closing Prices	June 10, 1957	May 10, 1957
Celotex	34½	34⅜
Same Pref.	18	*18-18½
Certain-Teed	9⅛	9¾
Champion P & F Co.	37	35
Same Pref.	90½	94½
Chesapeake Corp.	26	25¾
Container Corp.	18	18½
Same Pref.	*89-91	*65-91
Crown Zellerbach	51⅞	51¾
Same Pref.	92½	95½
Dixie Cup	67	66½
Eastern Corp.	27¼	*26½-27
Federal Paper Board	36	35
Same Pref.	*19⅛-19¾	19¾
Fibre Paperboard	28⅜	28⅛
Same Pref.	*103-105	100
Great Northern	72	80½
Hammermill	32¼	33¾
International Paper	103½	102¼
Same Pref.	*85¾-91	*90-92
Kimberly-Clark	48¼	43¼
McAndrews & Forbes	29¾	*35⅝-35¾
Marathon	30⅜	27⅝
Masonite	32¼	31¼
Mead Corp.	37	37⅛
Same Pref.	91	91
Minnesota & Ontario	31⅜	32¼
Oxford Paper	40¾	39⅛
Same Pref.	*92-93	*92-95
Rayonier Inc.	26	25¾
Riegel	28¾	*28⅝-29
Scott Paper	60¾	61¼
Same $3.40 Pref.	84¼	85
Same $4 Pref.	*96½-98½	96¾
Sealright	27½	—
St. Regis Paper	33⅜	32⅛
Same Pref.	91-94	*94-96
Sutherland Paper	38¾	36⅝
Union Bag-Camp	32½	31½
United B. & C.	22½	24½
United Wall Paper	9	8¾
Same Pref	*17-19	*18-19
U. S. Gypsum	61⅜	58
Same Pref.	*157-158	*106½-162
West Va. P. & P.	44¼	38¾
Same Pref.	*103-104	*103¼-104¼

New York Stock Exchange — Bonds

A. P. W. Products 5%	81	—
Champion P. & F. Co. 3¾%	—	97½
Champion P. & F. Co. 3%	—	—
Mead Corp. 3%	—	—
Scott Paper 3%	96	97½

American Stock Exchange — Stocks

Allied Paper	15⅛	—
American Writing	—	—
Brown Co.	16⅜	15¾
Puget Sound	15¾	15⅞

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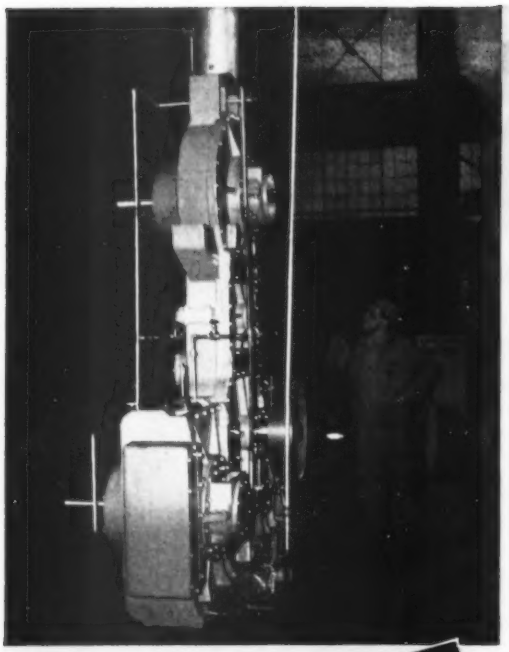

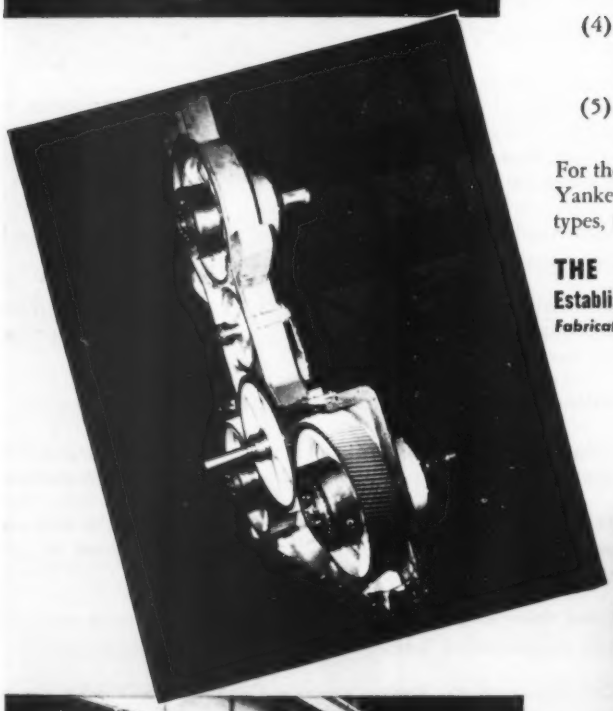

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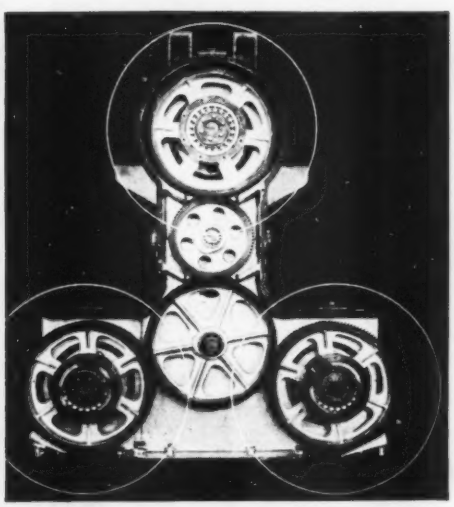

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1957

NEWS of the INDUSTRY

Midget Machine Does Giant Job for Crown Zellerbach

CROWN ZELLERBACH CORP. has put a midget to work at a giant's job.

The miniature is a 24-in. paper machine — complete in every detail—at the firm's central research department in Camas, Wash. The unit can be made to duplicate the work done by CZ machine giants ranging in size up to 284 in. It tackles experimental work with the efficiency of the mammoths of the mills, with results actually simulating plant operations. No need for the expense of a machine shut-down in the mill merely for trial-and-error testing.

Built and installed by Tidland Machine Co., the midget includes a Yankee dryer, a size press, 13 dryers and a seven-roll calender. It produces all types of paper from tissues to board grades at speeds of up to 250 fpm.

Almost completely new, the machine incorporates some parts taken from a unit built in 1911 for the manufacture of paper from rice straw. These parts consist only of the original fourdrinier wet end and the nine small dryers. Otherwise, the experimental machine is of 1957 vintage.

The Camas midget is the end result of long planning by Dr. W. W. Moyer, Crown Zellerbach's director of research, and engineers and chemists in the laboratory.

Yankee Dryer by Beloit

The original equipment was completely dismantled, after which Tidland Machine design engineers under the direction of Willis D. Smith incorporated the plans and recommendations of the CZ research department in completely rebuilding and assembling the experimental machine.

The frames in each section are of fabricated box section design and were manufactured by Tidland, as were the press rolls, new dryers and the drive stand mechanism.

Including the headbox, the over-all length of the foundation is 54 ft. 6 in., 18 ft. longer than the original machine. The over-all width of the frame and drive is about 8 ft. Maximum width of the sheet is 26 in. deckled.

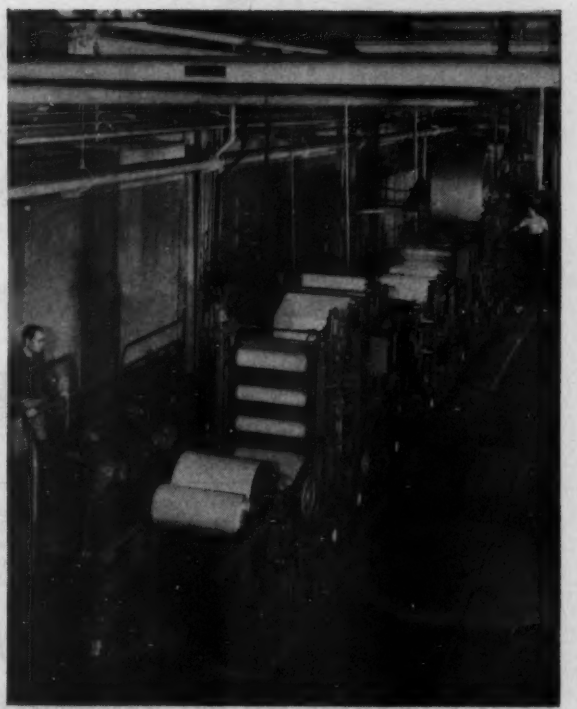
A 15-hp variable speed dc motor with an rpm range of from 100 to 2190 powers the line shaft drive. The motor operates off a 550-v generator plant. The power sequence includes variable pitch sheaves, clutches and gear reducers to accomplish the progressively increasing fpm speeds of the dryers and presses needed to control the draw.

The Yankee dryer was supplied by Beloit Iron Works (other equipment involved in the project was produced by Tidland) and operates on 125-lb. steam pressure. The nine original dryers use up to 75-lb. steam pressure, while the four new dryers operate at up to 150 psi steam.

Designed for Versatility

SKF and Shafer (Chain Belt) anti-friction bearings are used on all dryers, press rolls and journals with the exception of the felt rolls, which have graphite sleeve type bearings.

Sheehan back tender rings and ropes carry the sheet through each section of the experimental machine.



TWENTY-FOUR-INCH paper machine built by Tidland Machine Co. for Crown Zellerbach laboratory at Camas, Wash.

Automatic wire and semi-automatic felt guides are used on the dryer sections, with automatic felt tighteners on the final dryer section. All presses and the first three dryers are equipped with doctor blades. The Yankee dryer has one oscillating creping doctor and one oscillating cleaning doctor blade.

The machine was designed for versatility. The Yankee can be used for the manufacture of MG papers as well as wet or dry creped papers. Alternate methods by-pass the Yankee, using both wet presses and either one or both dryer sections.

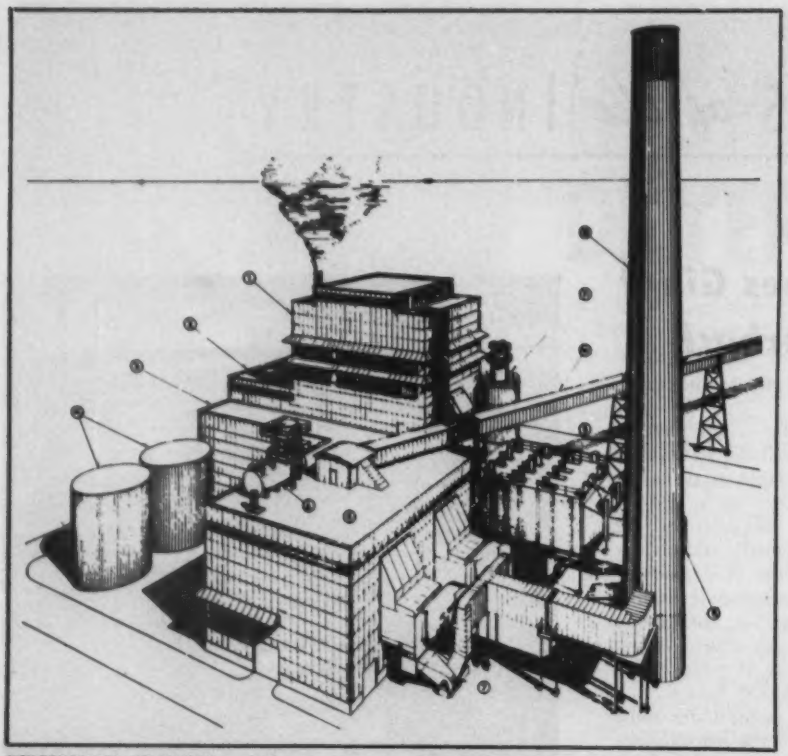
A unique feature is the second press, which can be used as a straight press, or — by addition of a creping attachment—used for wet creping or heavy creped papers. The second press may be utilized as a rewinder when making dry creped tissue or napkin grades on the Yankee dryer.

The size press can be used for the application of additives to either one or both sides of the sheet.

In addition to MG and creped papers, the experimental machine can produce MF papers, tissue and toweling grades, book, news, bag and specialty papers, corrugating medium and board stock from 12 to 400 lb. per ream.

To completely design and build a similar new machine would cost in excess of $100,000; but the value of the new equipment to Crown Zellerbach, according to Dr. Moyer, can hardly be qualified in dollars and cents.

(Turn to page 332)



PERSPECTIVE DRAWING of the power group building at the mill of British Columbia Forest Products Ltd. in Crofton, B. C. The various components of the operation are identified as follows: (1) recovery building; (2) evaporators; (3) steam header bay; (4) weak black liquor tanks; (5) deaerator tank; (6) power boiler house; (7) induced draft fan; (8) breeching; (9) precipitator; (10) hog fuel conveyor; (11) salt cake silo, and (12) 250-ft. stack.

Construction of British Columbia Mill Proceeding on Schedule

POWER INSTALLATIONS at the new Crofton, B. C. bleached kraft pulp mill of British Columbia Forest Products Ltd. are heralding the near-completion of the multimillion dollar plant.

The recovery boiler, steam boilers, multiple-effect black liquor evaporators and all auxiliaries for these units are grouped in one building area, thus giving the best control of operation and maintenance with a minimum crew.

Principal buildings are of structural steel with asbestos-cement board wall panels, concrete or steel grating floors and pre-cast concrete roof slabs. Also installed because of reduced maintenance costs are totally-enclosed electric motors, waterproof lighting fixtures, air-conditioned load centers and ventilated watertight instrument panels.

500,000 lb. per Hour

The sextuple-effect evaporators were furnished by the Conkey Div. of Chicago Bridge & Iron Co. and were built by Horton Steel Works Ltd. They are designed to evaporate an hourly 500,000 lb. of weak black liquor from 15 per cent total solids entering to 52 per cent total solids leaving and using steam at 40 psig. To minimize iron pickup by liquor and to increase the life of the unit, the first- and second-effect vapor heads are stainless-clad, and the first-effect tubes and tube sheets are of stainless type 304.

An indirect surface condenser is installed on the sixth effect to generate hot water for the pulp mill washer showers. All contaminated condensate is also utilized to conserve heat. Liquor pumps and some liquor lines are of stainless steel construction, as are strong liquor lines subject to severe corrosion.

The recovery boiler was supplied by Combustion Engineering Inc. and is designed to burn 1,600,000 lb. dry black liquor solids per 24 hours, generating steam at 625 psi and 750° F. The furnace design is relatively new, employing a straight-through gas flow instead of the conventional three passes and using a platen type superheater and slag screen.

The two cascade evaporators are arranged for series flow of liquor and parallel flow of gas, the cascades being set vertically on different elevations. The black liquor is concentrated to 64-72 per cent dry solids. Preheated liquor is injected at the primary air ports and at the secondary tangential air ports above the liquor nozzles. Smelt collects on the water-cooled decanting type furnace bottom and is tapped off by three water-cooled smelt spouts.

Hogged Wood or Bark

Steam requirements over the capacity of the recovery boiler are met by two Foster Wheeler Corp. semi-outdoor two-drum baffleless steam generating units. Each is designed to produce an hourly 20,000 lb. at 625 psig and 750° F. when burning oil. The units, however, are supplied with grate bottoms and pneumatic fuel distributors to make possible the burning of hogged wood and bark fuel straight or in combination with oil.

The boiler control instruments, supplied by Bailey Meter Co., are grouped in a panel and include fuel oil flow, steam and air flow and flue gas combustibles and 0_2 analysis.

Recausticizing Group

The recausticizing system is a conventional Dorr system with a hot lime slaker-classifier; three causticizing tanks 15 ft. in diameter by 10 ft. in height; a green liquor single-compartment clarifier 40 ft. in diameter by 15 ft. in height; a four-tray parallel-flow white liquor clarifier 35 ft. in diameter by 25 ft. in height; a mud storage tank 20 ft. in diameter by 18 ft. in height, and a single-compartment dregs washer 20 ft. in diameter by 18 ft. in height.

The entire causticizing operation produces white liquor at the rate of 15,500 lb. of active soda (NA_2O) per hour with a minimum of operating and maintenance labor.

Dierks Paper Mill Set for Summer Operation

Operation of the pulp and paper mill now under construction at Pine Bluff, Ark., by Dierks Paper Co. is expected late this summer. (Dierks Paper is a subsidiary of Dierks

(Continued on page 334)

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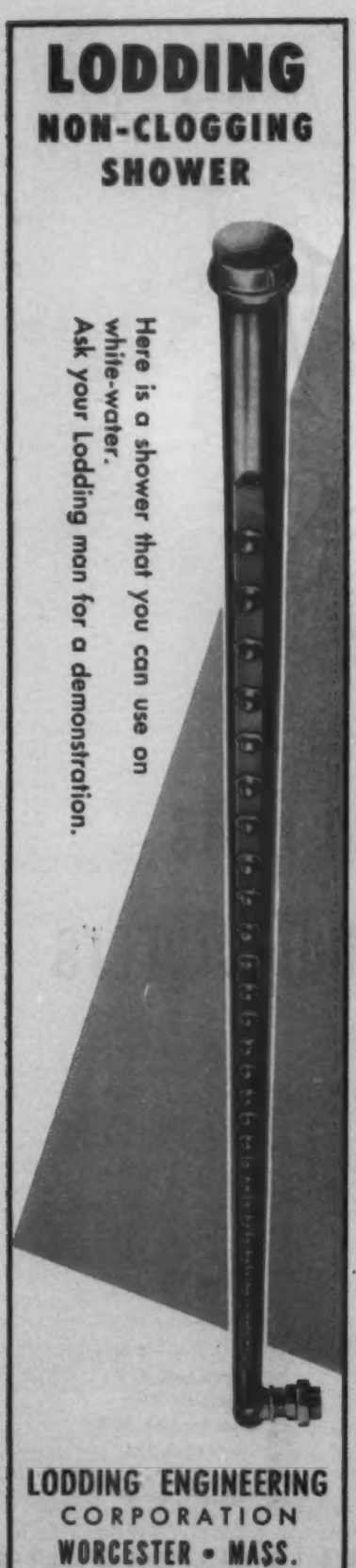


Forests Inc. of Kansas City, Mo.)

Installation of a 166-in. Black-Clawson paper machine (produced by the Paper Machine Div. at Watertown, N. Y.) was expected to be completed in July. It is designed to produce a daily 150 tons of high-grade kraft paper and board at speeds of from 200 to 1500 fpm.

The mill, comprising five buildings on a 1480-acre site, is being built along the Arkansas River at a cost of $15,000,000.

The paper machine—of the permanent cantilever fourdrinier type with an open headbox—features a dual box suction couch mounted as an integral part of the cantilever mechanism. This to make possible a quick wire change.

The press section will have two suction presses and one smooth press preceding the dryer section. Comprising the balance of the machine will be three sections of a 60-in. double-deck dryer; a breaker stack between the first and second dryer sections; a size press between the second and third dryer sections; two calender stacks, and an Autoflyte reel.

The entire machine will be driven through 11 Black-Clawson heavy-duty spiral bevel gear drives. The finished kraft rolls will be slit and rewound into mill rolls of up to 72-in. diameter on a B-C Model 40 winder.

The Pine Bluff plant has been designed by Rust Engineering Co. of Pittsburgh. Rust is also handling procurement and construction.

FEATURED SPEAKER AT the Nekoosa-Edwards corporate finance course was Rollie Barnum (l), account executive with Merrill Lynch, Pierce, Fenner & Beane. Other participants included (l to r) James Jesse, Nepco insurance and credits manager; Don Lichty, controller; John Melsen, tax department manager, and R. R. Johnson, law department manager.

Nekoosa-Edwards Paper Experiments in Financial Education for Personnel

An experiment in financial education for supervisory personnel has been termed a "tremendous success" by an official of Nekoosa-Edwards Paper Co. in Port Edwards, Wis. The five-week informal course in corporate finance was conducted by members of the firm's management group.

"It might be pointed out," said the company spokesman, "that corporate finance is traditionally considered pretty dry stuff. But, the supervisors who attended these classes showed overwhelming enthusiasm for the course and a genuine interest in corporate finance."

Attendance at the two-hour weekly sessions was strictly voluntary. The evening classes were held in the main office conference room.

News of the Industry . . .

In an article in the *Milwaukee Journal* it was pointed out that Nekoosa-Edwards executives were skeptical at first. However, they assigned a three-man group to explore the idea. (Included in the group were the manager of the law department, the supervisor of costs and budgets and the training director.)

Success Predicted

A preliminary outline was approved by the controller and executive vice president and was submitted to management personnel for appraisal. More than 80 per cent predicted its success.

The plan called for discussion periods with department heads and members of the statistics and accounting divisions as leaders. The only outside speaker was Rollie Barnum of the Milwaukee office of Merrill Lynch, Pierce, Fenner & Beane, investment bankers.

Subject matter included the nature and organization of a corporation under Wisconsin law, sources and uses of cash, the relationship of balance sheets and income statements, methods of financing for expansion, control of credit through the federal reserve banking system and planning cash requirements and investment methods (including acquisitions, purchases and mergers).

Presentation Practical

The course was designed to familiarize Nekoosa-Edwards supervisory personnel with basic financial terminology and procedures. Presentation was kept practical — with frequent references to the financial policies and practices of the firm, including a summary of its financial history.

The size of the classes was maintained at 15 to permit as much informal discussion as possible.

The course is to be repeated for the benefit of other personnel who have expressed interest. And courses on other subjects may be offered in the future, some of which may be designed for employees below the supervisory rank.

Expansion to Cost Champion $84,000,000

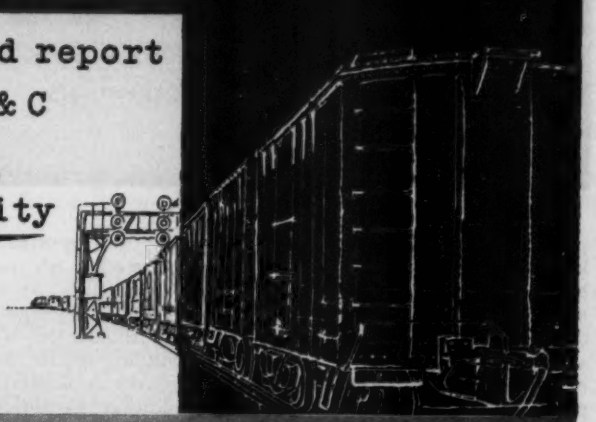
An $84,000,000 capital spending program over the next five years is planned by Champion Paper & Fibre Co. of Hamilton, Ohio.

In announcing the project, Reuben B. Robertson, board chairman, re-

MIN CHEMISTRY *at work*

case:

Condensed report on how M & C controls the quality of paper clays



An established system of watchfulness precedes the departure of every car of paper clay from an M & C plant. This permits papermakers' own quality control to extend all the way back through five M & C operations.

(1) *Appraised* Prospecting—to establish absolute fitness of clay deposit for use in paper

(2) *Controlled* Mining—amplified by crude clay selection, blending and testing to insure uniformity of brightness, viscosity, etc.

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(5) *Standard* "Guard Duty"—no car of Edgar-M & C paper clay rolls until the laboratory tests and okays finished product specifications. Each bag is a machine-weighed, scale-checked unit . . . each car approved for damage-free transit.

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Send: ☐ Detailed literature ☐ Free samples

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ported that the spending will be largely directed to increasing capacity by as much as 25 per cent if "the market can absorb the increase". If demand does not look that good, he added, the funds will be used primarily to improve the efficiency of present plants.

The program is to be financed mostly from depreciation and from ploughing back earnings. Also to be invested is an unused $14,000,000 balance from last year's $20,000,000 debenture.

At Houston, Texas, Karl R. Bendetsen, a vice president of Champion, declared that the Texas Div. at Pasadena will undoubtedly receive from $12,000,000 to $15,000,000 of the total. (Bendetsen is divisional general manager.)

Good Future Predicted for Appleton Institute

Completion of the Institute of Paper Chemistry's $750,000 building program and a 50 per cent increase in scholarships during the next three years have been forecast by John Strange, president of the Appleton, Wis. school.

It was reported that the Institute has reached 85 per cent ($521,000) of its goal for the building program. The project will add 40,000 sq. ft. to the plant, including a building for the Sulphite Pulp Manufacturers Research League and an addition to the present container building.

Scholarships will total $130,000 next year and are expected to hit $185,000 by 1960, Strange continued. During the past year five new member companies joined the Institute, bringing the total to 126 corporations with membership dues of $670,000.

Bowater to Boost North American Production

Bowater Paper Corp. Ltd. has announced in London, England, a program involving substantial capacity increases for its North American mills.

The 1959 goal in newsprint production is 1,000,000 annual tons. Bowaters' North American mills are at Corner Brook, Nflnd.; Liverpool, N. S. (Mersey Paper Co. Ltd.), and Calhoun, Tenn. And recently the firm began construction at Rock Hill, S. C., of a $38,000,000 pulp mill with a daily capacity of 400 tons of sulfate. Its operation is expected by the end of 1959.

Crocker-McElwain and Chemical Paper Combine

Two Holyoke, Mass. paper mills have been consolidated by vote of the stockholders of both firms. The companies—with combined service in the paper industry of more than 130 years—are Chemical Paper Mfg. Co. and Crocker-McElwain Co. The corporate name for the combination is Chemical Paper Mfg. Corp.

According to a joint announcement, the consolidation was made to bring about more efficient and economical operation, handling and delivery. The daily capacity of the two mills is 165 tons. (Production includes cotton fiber bonds, ledgers, indexes and onion skins; sulfite indexes, manifolds, cover papers; velums, technical and industrial papers; greeting card stock; stationery papers, etc., and also cylinder boards.)

Crocker-McElwain's two four-

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drinier machines turn out cotton content and sulfite papers, while Chemical employs three fourdrinier and two cylinder machines.

Recent Expansions in the Industry

Union Bag-Camp Paper Corp.
has acquired all the stock of Argent Lumber Co. of Hardeeville, S. C. Assets include a sawmill and 42,000 acres of timberlands.

St. Joe Paper Co.
of Jacksonville and Port St. Joe, Fla., will build a corrugated paper container plant in Houston, Texas, to replace the operation destroyed by fire in January. The 150,000-sq. ft. plant will cost about $1,000,000. Completion is expected in November.

Riegel Paper Corp.
will acquire the plant and equipment of the former Amos Packaging Div. of Amos-Thompson Corp. in Edinburg, Ind. All bag-making equipment now housed at the plant will be disposed of, and facilities will be installed to manufacture Riegel's broad range of packaging materials.

Building Products Ltd.
has in operation its new $1,500,000 insulating board products plant at Pont Rouge, Que. The operation is adjacent to the firm's existing mill at Pont Rouge.

Fort Wayne Corrugated Paper Co.
will increase by 27 per cent the size of its Chicago box plant in a $500,000 program. The addition of 47,700 sq. ft. will be the third enlargement since the division was organized in 1940.

Westminster Paper Co. Ltd.
of New Westminster, B. C., has not as yet reached a decision regarding the location for a proposed plant in eastern Canada. The site most recently considered was near Bertherville, about 35 miles northeast of Montreal.

Potlatch Forests Inc.
of Lewiston, Idaho, will construct a 55,000-sq. ft. plant at Sikeston, Mo., for the manufacture of paper cartons and containers.

New York & Pennsylvania Co.
has completed its move into new and more spacious offices at 425 Park Ave., New York, N. Y. The firm, formerly located at 230 Park, occupies the entire 17th floor of the new 31-story building.

Brown Co.,
with mills in Berlin and Gorham, N. H., has reported that its Bermico Pipe Div. will build a 20,000-sq. ft. plant in Los Angeles. The facility, which will produce electric conduit pipe from tar-covered paper products, will also serve as a Brown warehouse for the West Coast.

Allen Cartons Inc.
of Dayton, Ohio, will build a paperboard box plant in Jacksonville, Fla. The 20,000-sq. ft. operation, which was to be in operation by the end of July, will produce packages for frozen food products and grocery and bakery items.

Dominion Tar & Chemical Co. Ltd.
has purchased Howard Smith Paper Mills Ltd. Howard Smith is headquartered at Montreal and has mills

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DISC DIAMETERS

PRESENTATION OF THE National Safety Council's Public Interest Award for 1956 is made to The PAPER INDUSTRY. The honor recognizes public information media "for exceptional service to safety". The plaque is here presented to A. Scott Dowd (r), president and general manager of Fritz Publications Inc., by Robert Currie, NSC staff representative. Others shown, all of The PAPER INDUSTRY staff, are (l to r) Dr. A. W. J. Dyck, editorial director; Charles E. Dowd, advertising and production manager, and D. W. Zeigler, news editor.

at Cornwall, Ont.; Beauharnois and Crabtree Mills, Que., and the following subsidiaries: Canada Paper Co., Arborite Co. Ltd., Alliance Paper Mills Ltd. and Donnacona Paper Co. Ltd.

Inland Container Corp.
of Indianapolis will construct in Chicago a corrugated box plant of more than 140,000 sq. ft. The 35-acre tract was purchased from the Chicago & North Western Railway.

Bowater Paper Corp. Ltd.
of London, England, has offered to acquire all the common stock of Hunt Partners Ltd., English manufacturers of cartons and cardboard boxes.

Papercraft Corp.
of Pittsburgh has purchased the Fort Pitt Brewing Co. plant at Jeannette, Pa. Included in the acquisition were 15 buildings located on a 6-acre site that will add 200,000 sq. ft. to Papercraft facilities.

Fleming & Sons Inc.
of Dallas, Texas, one of the nation's oldest paperboard manufacturers, has entered the shipping container field. The new division is equipped with a Langston corrugator and complete finishing equipment and has a capacity for producing shipping containers at a monthly rate of 32,000,000 sq. ft. Output will include solid fiber containers and single-face rolls.

Allied-Albany Paper Corp.
of Albany, N. Y., is proceding with its plan for conversion to the production of newsprint and lightweight groundwood papers. Allied-Albany, for many years a producer of toweling and paper napkins, is the former A. P. W. Products Inc., the control of which was assumed in January by Allied Paper Corp. of Chicago.

Dixie Cup Co.
stockholders have ratified the merging of Dixie into American Can Co. Under the terms of the agreement Dixie stockholders will receive 1.65 shares of Canco common for each share of Dixie held.

Canadian International Paper Co.
has started production of foodboard at its plant in LaTuque, Que., following the completion of a lengthy and large-scale trial period. (Foodboard has hitherto been imported into Canada from the United States—and particularly from CIP's parent company, International Paper Co.)

Lawless Bros. Container Corp.
of North Tonawanda, N. Y., has purchased two Tonawanda divisions of Hubbs & Howe Co.: the Howe Paper Div. and the Sani-Tread Div. They will be operated as divisions of Lawless Bros. (Hubbs & Howe will concentrate its activities in the paper distribution field.)

Names in the News . . .

Allied News Briefs

Fisher & Porter Co. has acquired all sales and manufacturing rights to equipment developed by Olin Mathieson Chemical Corp. for generation of chlorine dioxide from sodium chlorite.

Warren Pumps Inc. of Warren, Mass., has opened a plant at Peace Dale, R. I. The new facility is being operated as a separate division.

Askania Regulator Co. has appointed Walter C. Carolan Co. of Kansas City, Mo., as sales representative in the area. At the same time, E. C. Deshautreau Jr., a manufacturers agent, was named to a similar service in the New Orleans area.

Coming Events

Tappi

Sept. 11-13—Eighth Testing Conference, Shoreham Hotel, Washington, D. C.
Sept. 23-26—Twelfth Engineering Conference, Netherland-Hilton Hotel, Cincinnati
Oct. 3-4—Second Deinking Conference, Hotel Niagara, Niagara Falls, N. Y.
Oct. 7-8—Twelfth Paper-Plastics Conference, Sheraton-Gibson Hotel, Cincinnati
Oct. 23-24—Seventh Corrugated Containers Conference, Benjamin Franklin Hotel, Philadelphia

Superintendents Association

Aug. 29-31—New York-Canadian Div., Saranac Inn, Upper Saranac Lake, N. Y.
Sept. 13-14—Northwestern Div., Hotel Duluth, Duluth, Minn.
Sept. 19-21—Northeastern Div., Poland Spring House, Poland Spring, Maine

Other meetings

Sept. 9-13—Instrument Society of America, 12th Annual Instrument Automation Conference and Exhibit, Cleveland Auditorium, Cleveland
Oct. 28-31—Society of Industrial Packaging and Materials Handling Engineers, National Industrial Packaging and Handling Exposition of 1957, Atlantic City, N. J.

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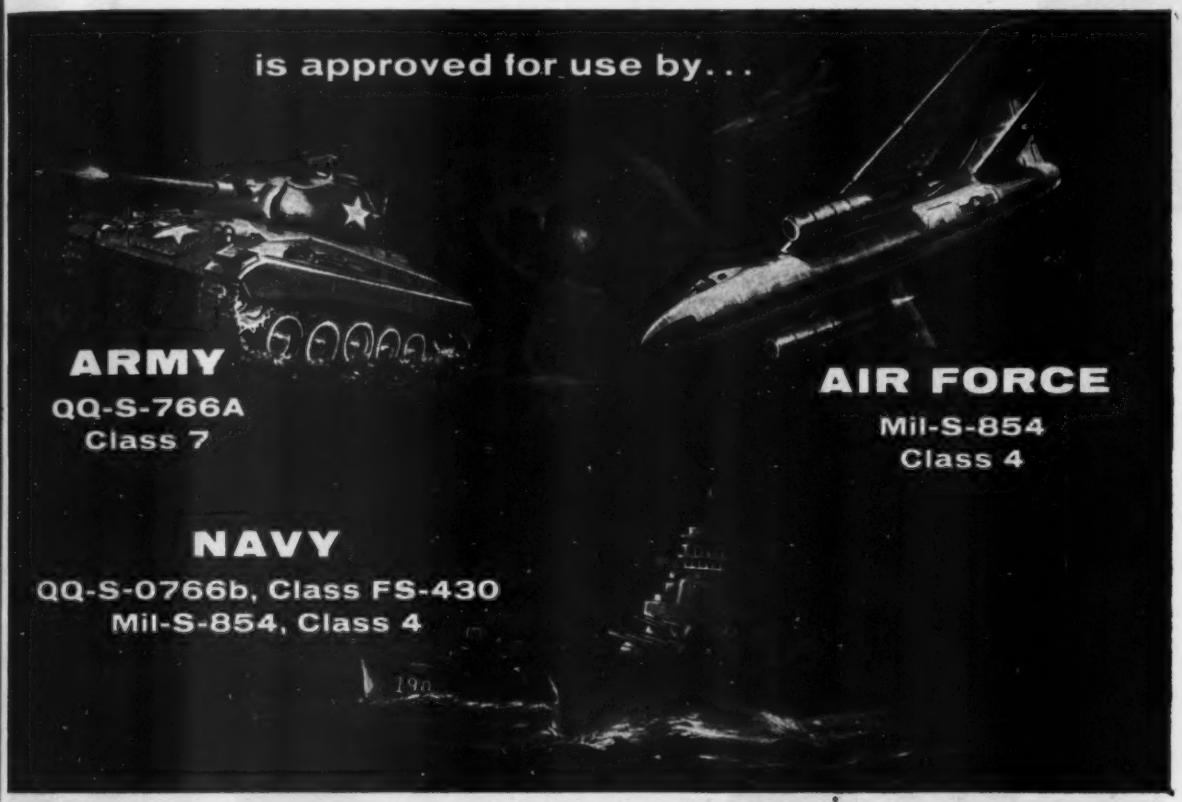
the general utility STAINLESS STEEL



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This straight chromium stainless grade possesses desirable qualities of beauty, corrosion resistance, strength, long life and low maintenance that are also of value in many civilian applications. More than 50% of all stainless applications could satisfactorily employ 430 stainless as an economical and practical material. Type 430 stainless costs 10¾ cents per pound less than the 18-8 grade. Some of our customers are already saving more than $215 per ton using our MicroRold 430 stainless sheet. Why not investigate the possibilities of this general utility 430 stainless.

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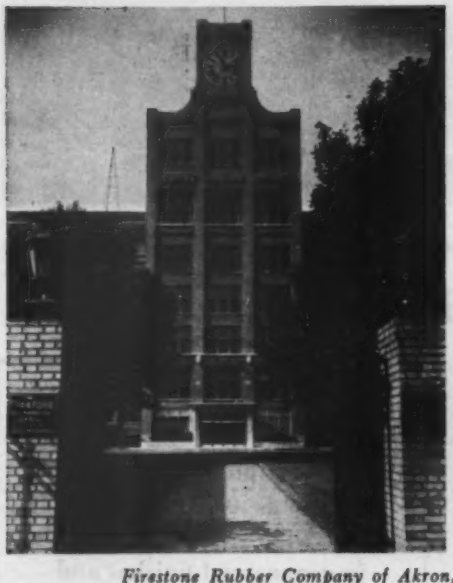

Firestone Rubber Company of Akron, Ohio, or Baxter Company of Cleveland, Miss., both industries require and receive the same attention regardless of their water needs. When you need water . . . you can count on Layne!

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LAYNE ASSOCIATE COMPANIES THROUGHOUT THE WORLD

NAMES in the NEWS

Bennie Burrish (upper l)

R. DeLaat (upper r)

James Madden (left)

Badger Paper Promotions

Badger Paper Mills Inc. of Peshtigo, Wis., has named Bennie Burish technical superintendent. Formerly chief chemist, he has been associated with Badger since his graduation from the University of Wisconsin in 1948.

Succeeding Burish as chief chemist is Raymond DeLaat, who joined the firm early this year. He is also a chemical engineering graduate of the University of Wisconsin.

In another Badger appointment James Madden was made finishing superintendent. He has been with the Peshtigo company since its founding in 1929 and was originally employed as a roll skinner in the pulp mill. He was named assistant superintendent in 1942.

R. P. Wollenberg Succeeds Wertheimer at Longview

R. P. Wollenberg, formerly vice president and manager of container operations, has been named vice president for operations of Longview Fibre Co., Longview, Wash. He succeeds the late R. S. Wertheimer.

In other Longview appointments, Dan B. Phillips was made manager of container operations to succeed Wollenberg. He was formerly manager of the Oakland, Cal. box plant.

R. P. Wollenberg

Dan B. Phillips

W. Q. Reiniger, manager of the Seattle box plant, becomes manager at Oakland. John W. Clarke, Seattle superintendent, replaces Reiniger as manager. Chesley M. Croco, tour foreman in the Longview box plant, becomes superintendent of the Seattle plant.

Cornell Elects

W. Irving Osborne Jr., former president, has been elected board chairman and chief executive officer of Cornell Paperboard Products Co. in Milwaukee.

At the same time, Arthur W. Miller, former executive vice president and a member of the firm for more than 40 years, was named president to succeed Osborne. (Chairman of the board is a new office recently created at a meeting of the directors. The office of executive vice president has been eliminated.)

West Virginia Promotions

West Virginia Pulp & Paper Co. in Mechanicville, N. Y., has announced a series of promotions and new assignments:

E. Horton Girdler, general foreman of the semichemical pulp mill, becomes head of the product development program; Philip Madeiros Jr., assistant foreman, succeeds Girdler; John S. Colter, acting assistant foreman, has become assistant general foreman of the semichemical mill; Richard A. Bartyzel has been transferred from the pulp mill to the finishing department to be responsible for inventory control of all finishing materials; Milton D. Tabor, a member of the pulp mill staff, becomes supervisor of the unbleached sulfite mill; William R. Dellinger, also of the pulp mill staff, assumes the responsibility of supervising the bleachery and bleached pulp storage and delivery.

Officers Named for New Weyerhaeuser Division

Officers named to operate Weyerhaeuser Timber Co.'s new Kieckhefer-Eddy Div. are as follows:

Howard W. Morgan, president; Herbert M. Kieckhefer, senior vice president; C. H. Carpenter, vice president of sales for shipping containers; D. C. Will Jr., vice president of the milk carton department; V. D. Donahue, vice president and controller; S. B. Clark, vice president; Anthony Hines, vice president for Eddy operations; E. K. Radke, vice president for shipping container sales, and T. E. Morriss, vice president in charge of boxboard and folding boxes.

(The Kieckhefer-Eddy Div. was created in April, when shareholders of Kieckhefer Container Co., Eddy Paper Corp. and Weyerhaeuser voted to merge the two former firms into the timber company.)

International Promotions

The following management promotions have been announced in the Southern Kraft Div. of International Paper Co.:

Howard D. Hinman, manager of the Georgetown, S. C. mill, has been named manager of the new mill at Pine Bluff, Ark.; J. Frank Mixson, mill manager at Springhill, La., replaces Hinman at Georgetown, and F. S. McMillan, assistant manager at Springhill, becomes manager of that operation.

Sydney Ferguson Retires at Mead Corp.

Sydney Ferguson, chairman of the board of the Mead Corp. since 1948, has retired from the manifold duties of that office. He will continue as a

member of the board of directors and of the finance, policy and executive committees.

Ferguson joined Mead at Dayton, Ohio, in 1919, serving as president from 1942-48. He served as president of APPA in 1952-54 and for many years has been a trustee of the Institute of Paper Chemistry.

A native of England, Ferguson came to the United States in 1913 and began his career in finance with the firm of Peet, Marwick & Mitchell, public accountants. From 1918 to 1919 he was associated with Minnesota & Ontario Paper Co. in Milwaukee.

James L. Madden, vice president and a director of Scott Paper Co., has been elected a director of Brunswick Pulp & Paper Co. in Brunswick, Ga. He is currently in charge of all timberlands, logging and pulpwood procurement for Scott and is the former president of Hollingsworth & Whitney Co. (Brunswick is jointly owned by Scott and the Mead Corp.)

James L. Madden

H. Y. Wilson

Haldane Y. Wilson, assistant general manager, has been appointed general manager of the Chattanooga, Tenn. folding carton plant and paper mill of Container Corp. of America.

Walter J. Meditz has been named manager of manufacturing for Standard Packaging Corp. of New York, N. Y. He was formerly assistant to the president.

W. J. Meditz

Paul C. Bobo

Paul C. Bobo, superintendent of power and electric maintenance since 1954, has been named Kingsport

Names in the News . .

Div. engineer for the Mead Corp. at Kingsport, Tenn. He replaces **Louis L. Mrachek,** who has been appointed to a Sloan Fellowship for an executive development course at Massachusette Institute of Technology. **James F. Smith** succeeds Bobo.

Thomas R. Stein, resident manager of the Jesup, Ga. mill of Rayonier Inc., has been named mill manager for Alaska Lumber & Pulp Co. Inc.'s dissolving grade pulp mill now under construction near Sitka, Alaska.

George M. Griffith Jr., a member of the engineering staff at the Luke, Md. mill of West Virginia Pulp & Paper Co., has been named to the newly created position of maintenance superintendent.

George Abel, director of forest engineering at Jacksonville, Fla., for St. Regis Paper Co., has been named director of technical forestry for the Mill Div. of Owens-Illinois Glass Co. at Toledo, Ohio.

John E. Ray III, vice president of the Camp Div. of Union Bag-Camp Paper Corp., has been made resident manager of the Franklin, Va. pulp and paper operations.

John E. Ray III

W. E. Parkinson

W. E. Parkinson has succeeded **Edward H. Nunn** as resident manager of the Crown Zellerbach Corp. pulp and paper mill in Carthage, N. Y. He was formerly general superintendent for the woodmill, finishing and services at Camas, Wash. (Mr. Nunn becomes resident manager of the mill of the newly formed St. Francisville Paper Co., now under construction at St. Francisville, La., and a joint project of Crown Zellerbach and Time Inc.)

Dwight L. Stocker, president of KVP Co. of Parchment, Mich., has assumed the chairmanship of the advisory committee on paper technology at Western Michigan University, Kalamazoo. He succeeds Bert H. Cooper, vice president of Kalamazoo Paper Co., who has retired after a two-year term. New vice chairman is **L. C. Nicholson,** vice president of W. C. Hamilton Co. And joining the committee is **James Wise,** president of Kalamazoo Paper.

Charles L. Kirkpatrick, secretary-treasurer, has been elected to the newly created position of vice president of American Writing Paper Corp.

Robert B. Turk, a senior engineer, has been made technical coordinator in the Pulp Mill Div. of Hammermill Paper Co. And **Max D. Leavy** has been named a junior engineer.

Laurence A. Combs, vice president of Container Corp. of America in Chicago, has been appointed chairman of the industrial relations committee of the National Paperboard Association.

L. A. Combs

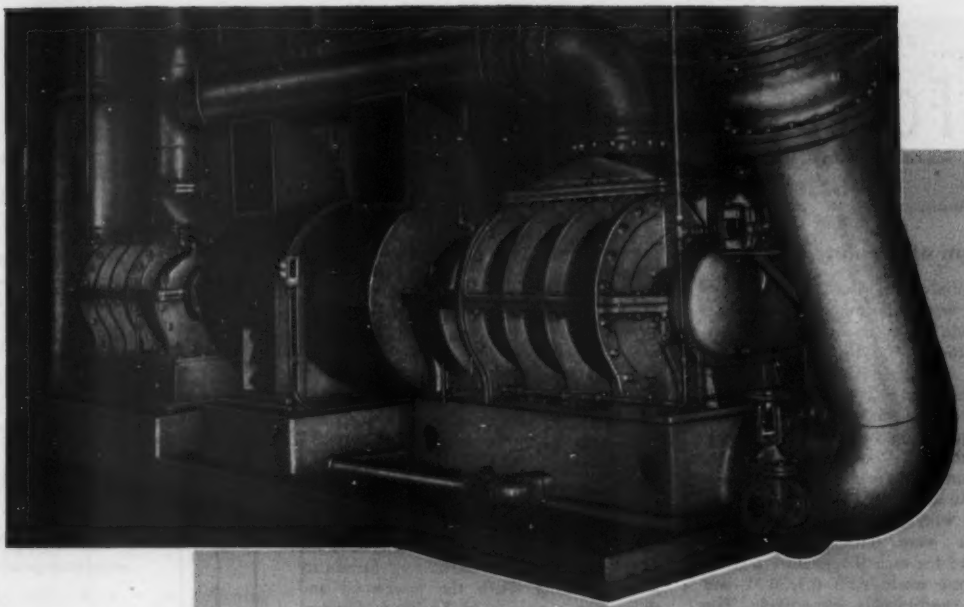
L. F. Beckers

Leonard F. Beckers, formerly assistant controller, has been elected controller of Crown Zellerbach Corp. to succeed Ralph S. Dunn, who has resigned because of ill health. Named assistant controllers were **William L. Meyer,** formerly a vice president of Gaylord Container Corp., and **Fred H. Land,** formerly accounting personnel manager for CZ.

John B. Shields, formerly with Continental Can Co. Inc., has joined Riegel Paper Corp. as a product engineer in the New York, N. Y. office. He will work in the packaging materials department.

James A. Cobb has been named general manager of the Salisbury, N. C. plant of the National Container Corp. Div. of Owens-Illinois Glass Co. He has been a member of the plant's staff for the past seven years.

(Turn to page 368)



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FOREIGN ABSTRACTS

Mechanism of alkaline pulping

Using reproducible samples of *Eucalyptus regnans* wood, the author undertook a series of soda cooks under carefully controlled conditions. The digestions were carried out in a specially devised percolator-digester, which is fully described and of which a sketch is given.

Under these conditions the cooking liquor concentrations could be kept essentially constant at the temperatures studied (i.e. 130, 150 and 170°C.). Wood shavings preextracted with alcohol and water were used. These were 0.03 millimeters in thickness, and for each temperature a series of cooks were made with 0.5, 0.25 and 0.1 normal caustic soda respectively. The loss of lignin, pentosans and cellulose were all studied. Because of the various factors, temperature seemed to have the greatest effect. At a specific temperature, delignification was controlled largely by the concentration of the cooking liquor and to a certain extent by the flow rate of the liquor. Cellulose losses appeared to be nearly independent of either of these variables. The losses in pentosans depended mainly on the actual amount of alkali used in the digestion irrespective of the actual concentration, the flow rate or the cooking time.

When two cooks were made at different temperatures, the ratios of the time periods required to reach the same percentage yield were calculated. This type of ratio was also computed in the case of Klason lignin removal and percentage loss of pentosans. These ratios have been shown graphically to be quite irregular, thus indicating that the reactions do not obey a rate equation of any integral order.

In general, the present data are in harmony with those of previous workers. At times in the past, expressions in the form of a modified first order reaction have been applied in describing the pulping mechanism. However, these can only apply to a very limited phase of the reaction and the use of such expressions is not justified.

The author believes that if a precise mechanism were to be evolved in the case of alkaline pulping, the following precise information would be required: the area and the nature of the surface on which the reaction occurs, the concentration of chemical present on that surface at all stages of the digestion and the rate of desorption of the reaction products from this surface.

J. F. Hobden, *Australian Pulp & Paper Ind. Tech. Assoc. Proc. 10*, 99-127; discussion, 127-31 (1956).

Sulfite pulp from larch wood

The heartwood of larch (*Larix leptolepsis*, Murray), contains an arabogalactan and much taxifolin, and gives about 20 per cent of screenings when pulped by the conventional calcium base sulfite process. The addition of a non-ionic surface-active agent to the cooking liquors had little effect in reducing the screenings. But when cooks were made by the use of the magnesium base sulfite process, the screenings were reduced to 9.4 per cent. When ammonium or sodium bases digestions were resorted to, with adequate prepenetration of 2 to 2.5 hrs. at 105°, the screenings were only about 1 per cent or less.

In this way very good dissolving pulps adequate for rayon manufacture, were obtained. These gave good alpha-cellulose contents and showed satisfactory filterability after screening. Both the heartwood and the entire wood could be used. Conventional three-stage bleaching was adequate.

Seven tables, two graphs and 27 references are included. Eizo Nokihara, *J. Japan Tech. Assoc. Pulp Paper Ind. 10*, No. 7,342-7 (1956) (Original in Japanese with English summary).

Lignins extracted from wood by neutral solvents

This is the second paper in a series dealing with studies on finely divided wood [of THE PAPER INDUSTRY, *38*, No 7,626 (1956)]. The work has now been extended to softwood and hardwood lignins isolated from wood after alcohol extraction and carried out in a non-swelling medium by means of a vibrational ball mill. These lignins are termed "milled wood lignins", or M.W.L.

Possible analytical changes that might occur during the process of isolation of M.W.L. from spruce (*Picea abies*), both under nitrogen and in air were studied. The latter caused slight oxidation. M.W.L. isolated under nitrogen contained 63.48 per cent carbon, 6.35 per cent hydrogen and 14.85 per cent methoxyl.

An extended quantitative study was also made as to how other forms of oxygen occurring in M.W.L. were distributed. This oxygen was present (besides methoxyl) as phenolic and non-phenolic OH, as carbonyl and in the form of aryl-alkyl and dialkyl ethers. As a result of these analyses, a proximate empirical formula for spruce lignin is given. Invariably the lignin fractions from milled spruce contained small but appreciable amounts of carbohydrate material closely associated with the main lignin component. These varied from 1.9 to at least 6.5 per cent. On hydrolysis of such lignin samples, the sugars galactose, glucose, mannose, xylose and arabinose were always formed with mannose predominating.

The properties of softwood M.W.L.s from the following species were also studied: *Picea mariana, Pinus sylvestris,*

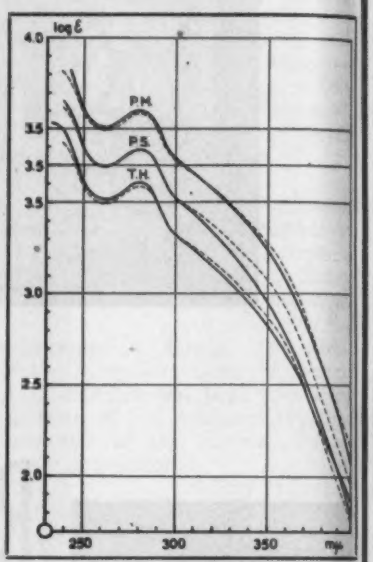


Fig. 1

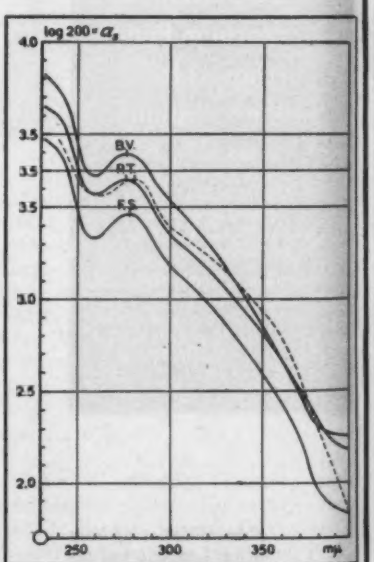


Fig. 2

Tsuga heterophylla and *Thuja plicata*. All of these had compositions and ultraviolet light absorption spectra very similar to those of *Picea abies* (Sf Fig. 1).

Analyses were also made of M.W.L. from the following hardwoods: *Betula verrucosa* (58.82 per cent carbon, 6.49 per cent hydrogen and 21.51 per cent methoxyl); *Populus tremula* (60.36 per cent

carbon, 6.16 per cent hydrogen and 21.44 per cent methoxyl) and *Fagus silvatica* (60.33 per cent carbon, 6.27 per cent hydrogen and 21.39 per cent methoxyl). The hardwood lignins showed greater variations than did the various softwood lignins (cf Fig. 2). Molecular weight determinations were made on *Picea abies* M.W.L., using the ultracentrifuge sedimentation technique and also by means of diffusion experiments. Various fractions were studied, and all of them (including a sample that was milled 19 hours) gave a value of about 11000 (weight average). Brauns native lignin had a much lower molecular weight. The spruce M.W.L. had a density (d_4^{20}) of 1.406 and an n^{20} (at 5460 A) of 1.609. The lignin was optically inactive.

Forty-three references, 11 graphs and 10 tables are included. Anders Björkman and Börje Person. *Svensk Papperstidn. 60*, 158-69 (in English).

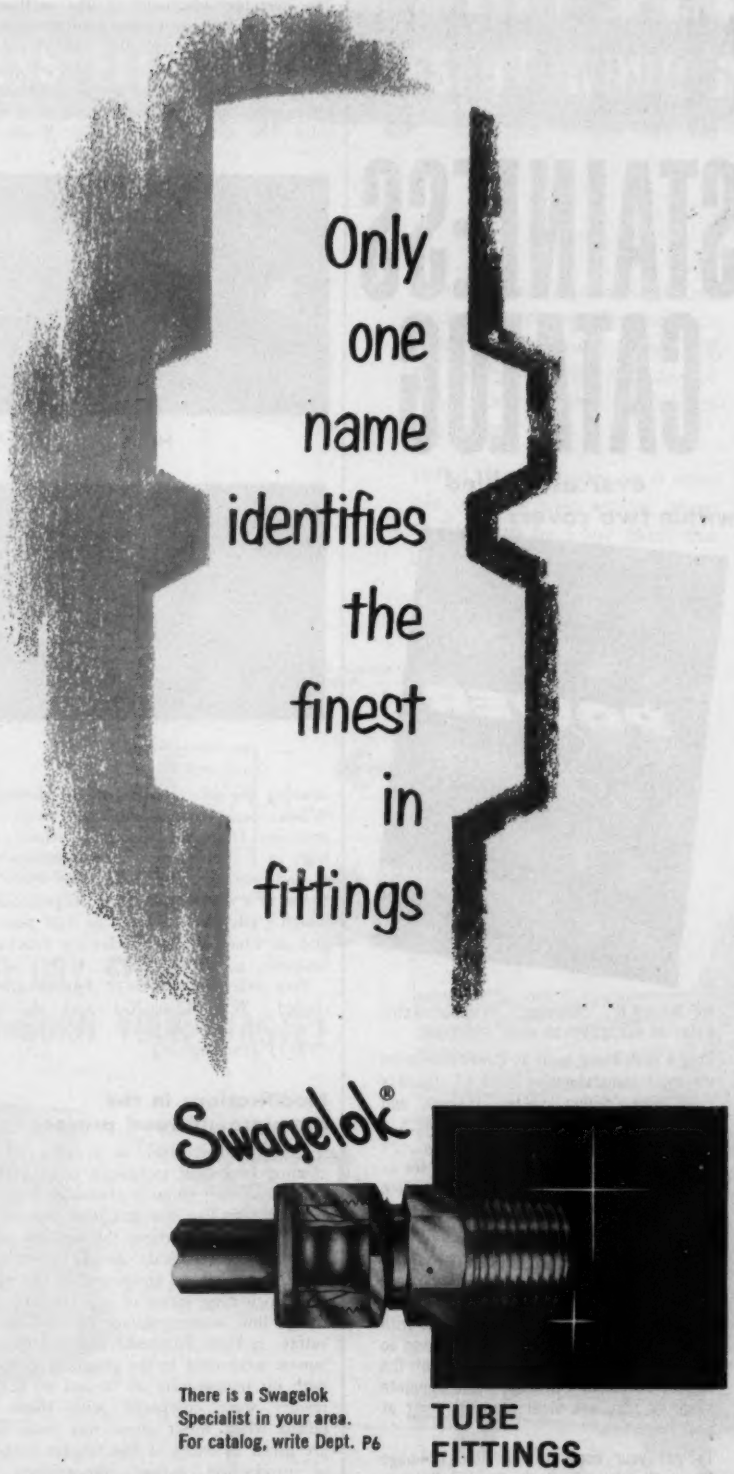
Determination of fiber bundles in fiber suspensions

In testing the efficiency of defibering equipment, the authors devised a technique for determining the percentage of undisintegrated particles (in very small amounts) in a pulp suspension after a series of passages through the disintegrator. Actually, an artificial mixture was used consisting of 80 per cent of a fully defibred sulfite pulp mixed with 20 per cent of macerated "Hollerith" cards (*I*) of very high wet strength. *I* served in replacing the usual fiber bundles found in an incompletely disintegrated pulp. (These bundles are termed "Stippen").

The mixtures having a stock density of 3.5 per cent were put through the defibering machine a number of times, and after each passage the percentage of *I* was determined quantitatively. In these determinations the original pulp suspension was divided into six portions of 0.5 liters each. These were placed in six large cylindrical beakers and diluted in each case under closely standardized conditions to 10 liters. The resulting suspensions settle in part, and *I*—being denser than the sulfite pulp—settles more rapidly than does the pulp itself. The latter, in suspension, is then decanted off from the lower layer (containing *I*) which retains some fibers, but in which *I* accumulates. The operations of forming a 10-liter suspension, of decanting and of concentrating *I*, are repeated about 26 times.

The operations are carried out in each of the six beakers. The pulp suspensions themselves are kept, screened and formed into sheets which are tested for residual *I*, by staining with malachite green which does not stain *I*. After the 26th treatment, *I*, with slight amounts of adhering pulp, is transferred to a blue glass, separated from the disintegrated fibers and finally dried at 100-105°C and weighed. The amount of residual *I* is computed in terms of grams per 500 cc. of suspension. The results are handled statistically, and typical calculations are given. With each passage through the disintegrator, the percentage of *I* decreases.

The precision and the accuracy of the methods and its limitations are discussed.



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The seeming advantage of the method is that it can account for very small amounts of *I*, which previous methods could not do. Results of numerous experiments showing decreasing amounts of *I* are shown in halftones and the data are expressed graphically. The method is applicable in demonstrating the effectiveness of the defibrator. When test sheets were made with suspensions from the defibrator, those very high in *I* showed very large particles of *I* as indicated in Fig. 3. At the other extreme is a sheet made from suspensions in which *I* had been reduced to 0.07 per cent and in which the *I*-particles are practically invisible, as shown in Fig. 4.

Fig. 3

Fig. 4

Five references and 17 figures are included. W. Müller-Rid and A Stark *Wochenbl. Papierfabrik. 85,* 159-166 (1957) (in German).

Modifications in the chemigroundwood process

The usual method in pulping by the chemigroundwood technique is to pretreat the wood with suitable chemicals and subsequently to use the grinding process.

In their modification, the authors added the various chemicals *during* (not prior to) the mechanical treatment of the wood. In an orienting series of experiments, relatively low concentrations of sodium bisulfite, sodium dithionite and sodium carbonate were used in the grinding of spruce with pit temperature of 70 and 90°C. The results were compared with those obtained when water alone was used. Data are given in terms of the relative economy of production, power consumption and pulp quality.

In this initial series, the over-all effect of added chemicals was negligible. In another series, the amount of chemical was greatly increased. In some cases 55 per cent of chemical, based on dry wood, was used even though the actual concentration in the water used in grinding was only about 1 per cent. In this series, the chemicals were sodium sulfate, sodium bisulfite, sodium sulfite and sodium carbonate. It was found that sodium sulfite caused an improvement in brightness and in the breaking length of the pulp over that obtained when the chemical was omitted. Sodium carbonate addition had a beneficial effect in improving production and in reducing power consumption, but it caused a decrease in pulp strength and brightness.

When aspenwood was ground, sodium carbonate proved very efficacious. It helped in increasing production, in decreasing power consumption and the breaking length. Tear resistance and rate of hydration all increased. There was relatively little loss in brightness. On the other hand, this aspen "chemigroundwood" never reached the strength properties shown by commercial spruce groundwood. Sodium sulfite solutions applied to aspen (at pit temperature of 90°) showed a decrease in power consumption and an increase in tensile strength and tear. Neutral salt solutions (like sodium sulfate) were without effect. Possibly a part of the beneficial effects of carbonate and sulfite were due to swelling effects. Bisulfite at pH 4-5 increased pulp brightness—an action which is discussed. One of the possibilities in this increase in brightness is in the possible prevention of iron salts in the water from being sorbed by the pulp.

Eleven figures and about 25 references are given especially to some of the earlier patents in this field. Water Brecht and Hermann Weiss. *Das Papier 11,* 82-89 (1957) (in German with brief English summary).

Tall oil rosin

This is the first of a series of papers on tall oil rosin. The contents takes up methods of analysis. A review is given of the literature, and a method of calculation has been proposed for the simultaneous spectrophotometric analysis of mixtures of abietic and dehydroabietic acid.

When spectral overlapping of these compounds was accounted for in the calculations, the results were quite satisfactory. However, it was found that because of the low specific absorption coefficient of dehydroabietic acid, a mild hydrogenation was required to eliminate the background interference when accurate dehydrobietic acid determinations were required. A sample of commercial crystallized tall oil rosin, freed from fatty acids and neutral compounds on analysis, was found to contain the following amounts of components: 42 per cent abietic, 1 per cent neoabietic (?), 27 per cent dehydroabietic acid, 19 per cent dextropimaric acid (without differentiation of isomers), 5 per cent dihydroabietic and 8 per cent tetrahydroabietic acid.

By studying results given in the literature, it is evident that the treatment given raw tall oil has a marked effect on the composition of the resulting rosin.

Five tables and 31 references are given. Paavo Kajanne and Erkki Honkanen. *Paperi ja Puu* (Finland) *39,* 4a, 171-177 (1957) (in English).

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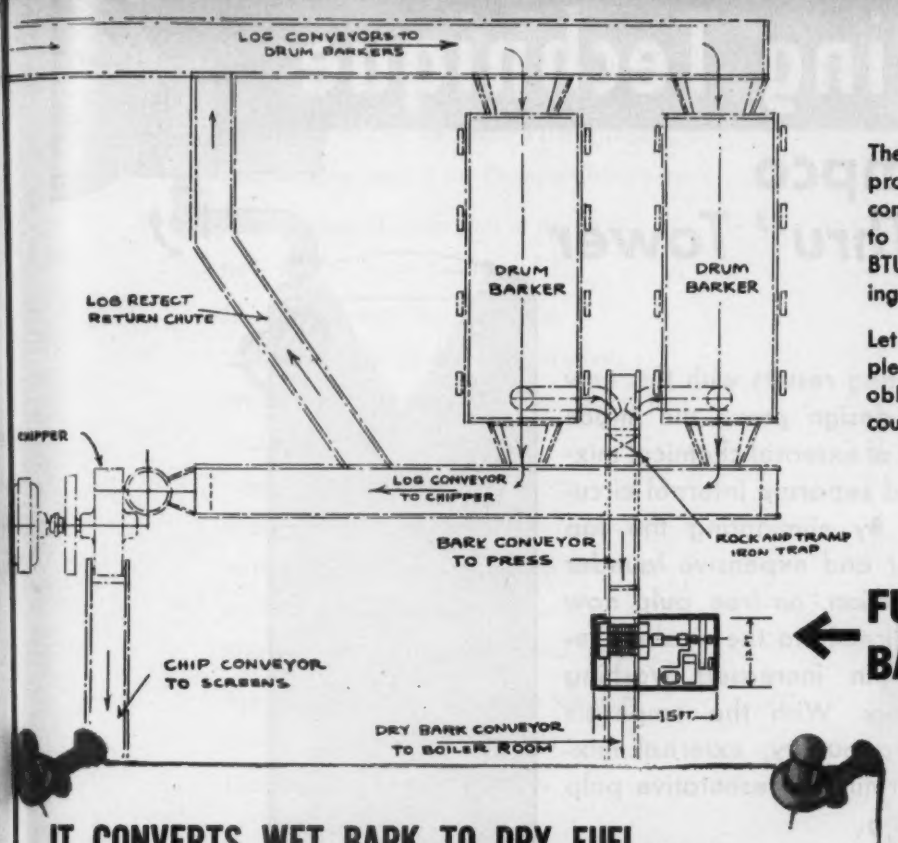

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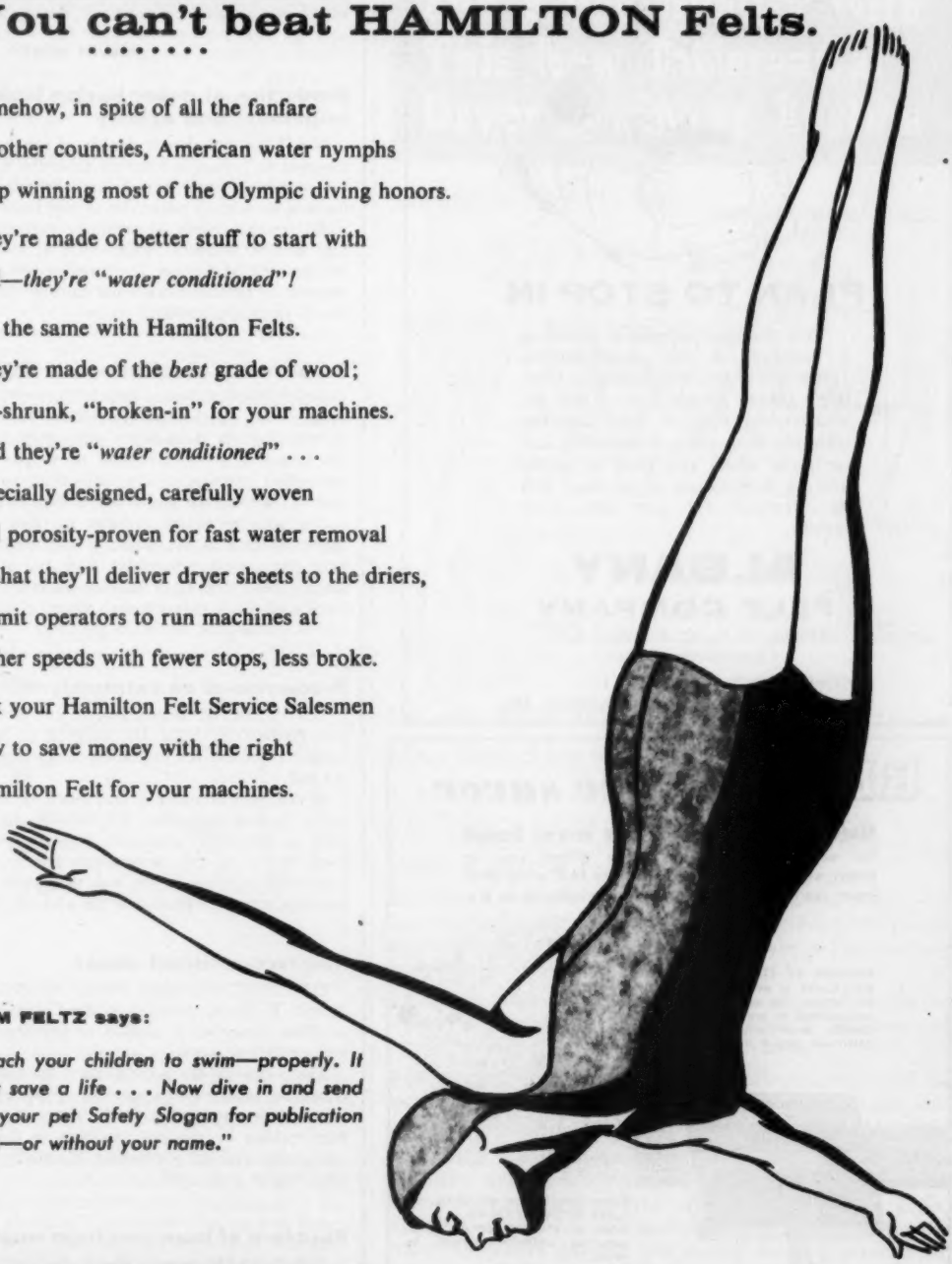

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PATENT REVIEWS

MELVIN NORD*

Production of paper having high brightness and opacity

U.S. 2,786,757, issued March 26, 1957, to Louis B. Taylor and assigned to Columbia-Southern Chemical Corp., describes a method for preparing paper having high brightness and opacity, suitable for use as writing paper, or as top liner for boxboard cartons.

An aqueous slurry of cellulosic paper pulp and aluminum sulfate is first prepared. This slurry is reacted with finely divided calcium silicate having 2 - 4 moles SiO_2/mole CaO, prepared by reaction of sodium silicate and calcium chloride. The paper is produced from the resulting slurry.

Evaporation of sulfite waste liquor

U.S. 2,786,518, issued March 26, 1957, to Carl Johan Lockman, assigned to Aktiebolaget Rosenblads Patenter, describes a method of reducing the incrustation difficulties in evaporating waste sulfite liquor to a solids content of 50 per cent or more in a multiple-effect evaporator. The difficulties are greatest when the content of solids in the liquor is less than 20 per cent.

The solution to the problem involves feeding part of the thin liquor to each of the stages of the multi-effect evaporator, along with the normal progressive flow and recycling part of the exit stream from each stage back to its inlet. As a result, the concentration of solids entering each stage, as well as leaving each stage, can be maintained above 20 per cent.

Production of an extremely thin web of paper

U.S. 2,786,398, issued March 26, 1957, to Reavis C. Sproull and Herbert G. Hard Jr., assigned to Sprague Electric Co., describes a process for producing paper having a thickness less than 0.2 mil.

A thin web of paper is laid down on a conventional fourdrinier paper-forming apparatus. To transfer the web from the forming wire to the drier, a smooth foil-type pick-up band of metal is used instead of the conventional felt or mesh screen. This overcomes the tendency of the web to remain partially adhered on the forming wire and tearing at the pick-up transfer.

Moisture-resistant paper

U.S. 2,786,786, issued March 26, 1957, to Leo J. Novak and Joseph T. Tyree, assigned to the Commonwealth Engineering Co. of Ohio, describes a method of manufacturing water-resistant or water-repellent paper.

These objects are accomplished by associating with the paper, either by incorporation into the paper stock by addition to the beater or by application to the paper at a subsequent stage in the papermaking or treating processes, a dextran or dextran partial conversion product containing chemically bound radicals derived from higher fatty acids.

Recovery of base ions from waste sulfite liquor

U.S. 2,785,955, issued March 19, 1957, to William Potter and Edgardo Parsi, assigned to Ionics Inc., provides a cyclic ion-exchange method of recovering sodium ions from waste sulfite liquor and producing fresh cooking liquor.

The process involves contacting an appropriately strong acid cation-exchange resin partially in the sodium form with an acid sulfite solution, to bring about an exchange of hydrogen from the acid for at least part of the sodium of the resin, producing a solution containing sodium bisulfite. This bisulfite solution is then contacted with a weakly acid cation-exchange resin primarily in the sodium form to bring about additional exchange of hydrogen

*Patent attorney, 17600 Pinehurst, Detroit 21.

ions for the sodium of the resin. The resulting solution is ready for use as a neutral or acid sulfite cooking liquor.

The original acidic material is in part derived from the waste liquor of a prior sulfite cooking operation. A certain amount of SO_2 is recovered or produced from such liquor and is dissolved in water to form at least a part of the acid required.

The cation-exchange resins are subsequently recharged by contacting with an alkaline liquor derived from the smelting of a prior neutral or acid sulfite cooking liquor. Thus, a cyclic process is provided, in which cooking liquor is available for the pulping of successive batches of wood.

Sulfite liquor derivatives

U.S. 2,786,820, issued March 26, 1957, to Curt Uschmann and assigned to Cascades Plywood Corp., describes the production from sulfite waste liquor of a product which is useful as a varnish base, as a moldable plastic, as a hardening medium for synthetic rubber products, as a synthetic substitute for natural rubber and as a thermosetting binder. It is particularly valuable for mixing with metallic pigments to afford colors resistant to fading. It can be used as an ingredient of a phenol-formaldehyde resin binder and pigment mix to render the phenol-formaldehyde resin and pigment compatible, thus preventing fading.

The sulfite liquor is heated to the boiling point, and at intervals during the heating process reactive ingredients are added to it. The first such addition is caustic alkali. Phenol or phenol and furfural is added later.

Semi-hydrotropic chemical pulping process

U.S. 2,783,146, issued Feb. 26, 1957, to Ralph H. McKee and assigned to McKee Development Corp., describes a process for cooking a lignin-containing cellulosic material without appreciable loss in weight of the lignin content of the material. The process is low in equipment cost and may be carried out in open tanks.

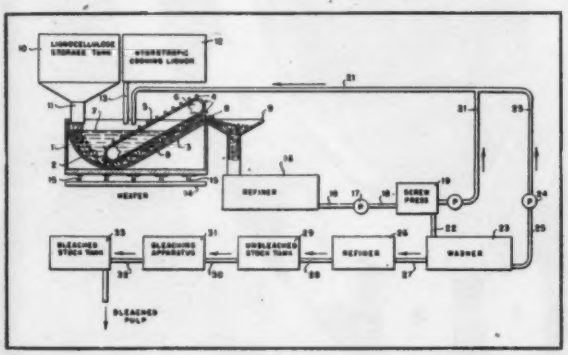


Fig. 1

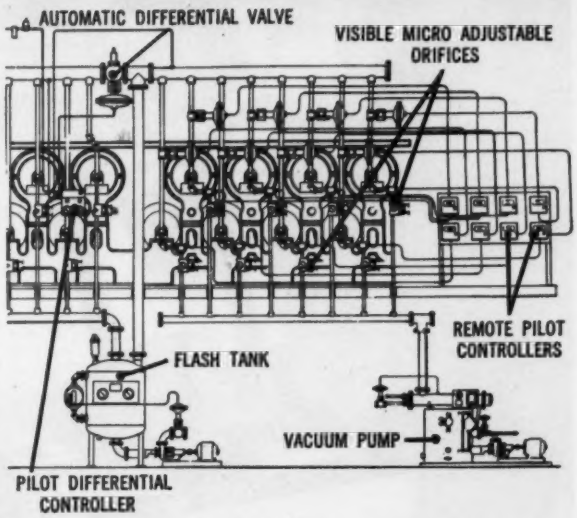
As shown in Fig. 1, an open rectangular tank 1 is provided with a curved bottom wall 2 having a flat inclined section 3, up which the treated lignocellulose particles are pushed by means of pusher bars 4 disposed on an endless belt 5, the treated particles 8 falling into a funnel 9.

The cooking liquor 7 is a weak hydrotropic salt solution, such as a 2 per cent sodium xylensulfonate solution adjusted to a pH of 4.0 by acidification with xylensulfonic acid. The particles 8 are treated for 2-4 hours at about 95°C. to yield a tan-colored pulpy product having about half its pentosan content removed, but having substantially all the original lignin content. The pulping is thus caused by selective extraction of pentosans and not by complete dissolution of all pentosans and lignin.

The cooked pulpy or softened lignocellulose particles are conducted through funnel 9 into a refiner 16, where they are disintegrated into coarse fibrous constituents. They are then pumped by a slush pump 17 into a screw press 19 where the pulp is separated from the solvent solution. The recovered solvent is recycled for further use. The pulp is then washed with water, refined and bleached. The bleached stock is ready for manufacture into paper.

The pulp produced by this process possesses many of the desirable properties of groundwood, which contains all the pentosans, without possessing the undesirable groundwood properties such as turning yellow or brown on exposure to ultraviolet light. It

Step Up Production and Raise Quality with This New Differential Dryer Drainage System



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2. Lower installation cost. Each Stickle system is engineered to meet individual requirements exactly. Present equipment in good operating condition is retained, and no unnecessary equipment is included.

3. Remote pilot controller may be located conveniently for instant setting of any temperature desired in key wet end dryers to prevent picking, curling, cockling.

4. Pneumatic pilot operated differential controller may be located in front or back of machine near wet end for convenient observation and adjustment of differential pressures.

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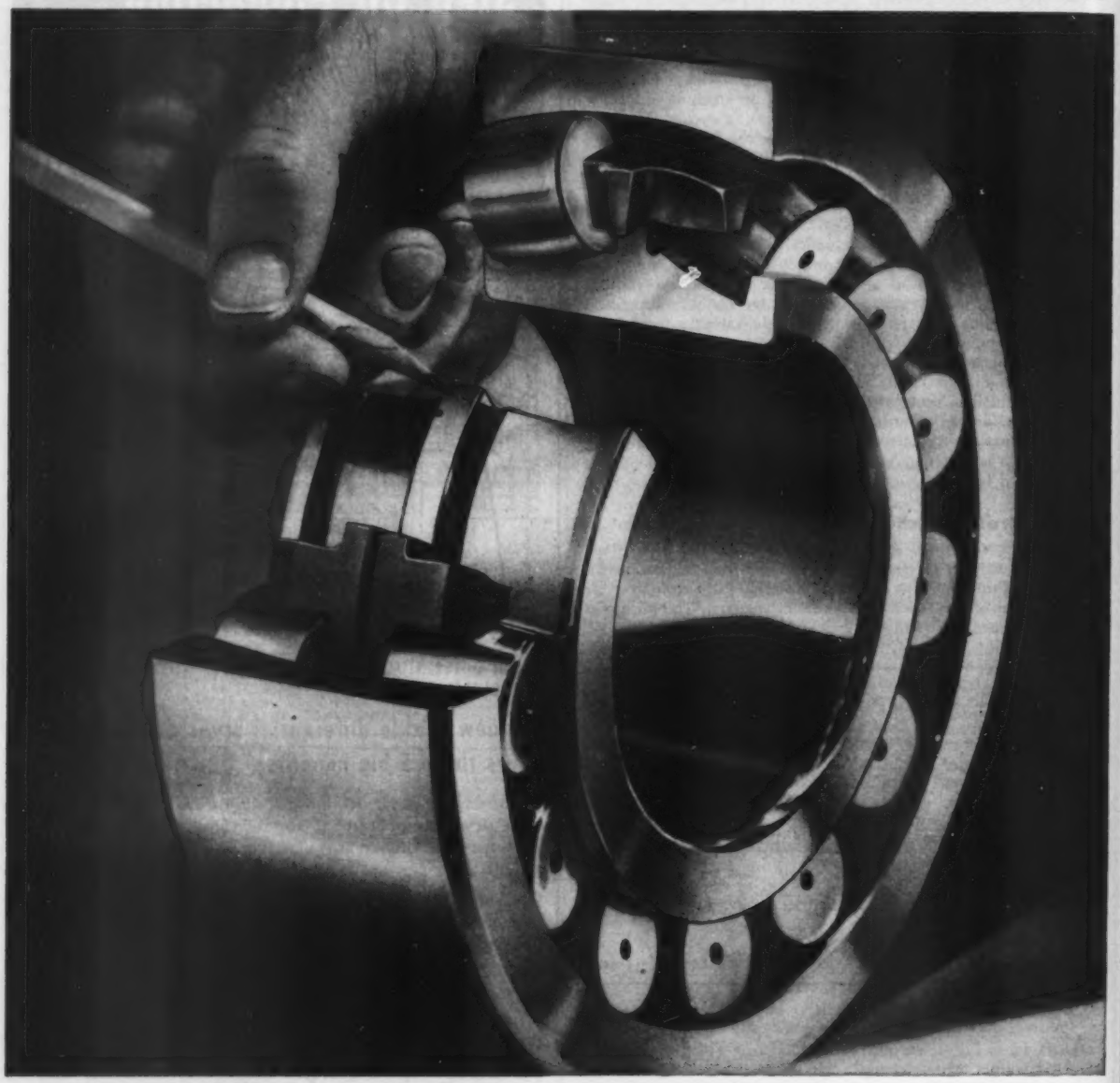

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possesses a fibrous texture and strength characteristics similar to that of the commonly available chemical sulfite and sulfate pulps, yet it also possesses the high opacity of groundwood pulps (over 90 per cent).

The yield of pulp is about 90 per cent of the weight of the original lignocellulose, as compared with 50 per cent of the sulfite or sulfate processes. There is practically no waste disposal problem, since no lignin is extracted.

Removal of water in the press section of a papermaking machine

U.S. 2,783,689, issued March 5, 1957, to Helge N. Skoldkvist, provides an improvement in the prepress rolls of a papermaking machine.

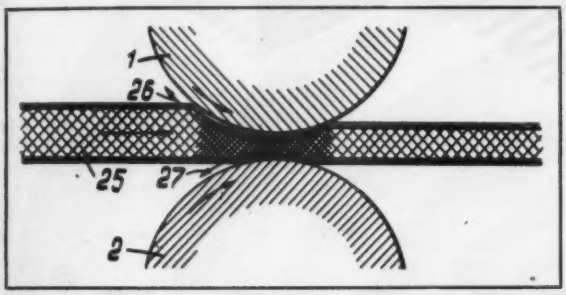


Fig. 2

In the conventional prepress machine, the action is of the type shown in Fig. 2, i.e. the water pressed out of the wet sheet has to flow off in a direction which is opposite to the direction of movement of the wet sheet. If the compression and the extraction of water in any one step is too great in relation to the speed of movement of the wet sheet, the extracted water will obtain such high speed relative to the wet sheet and so high a pressure that the matting in the sheet is damaged and a crushing effect arises.

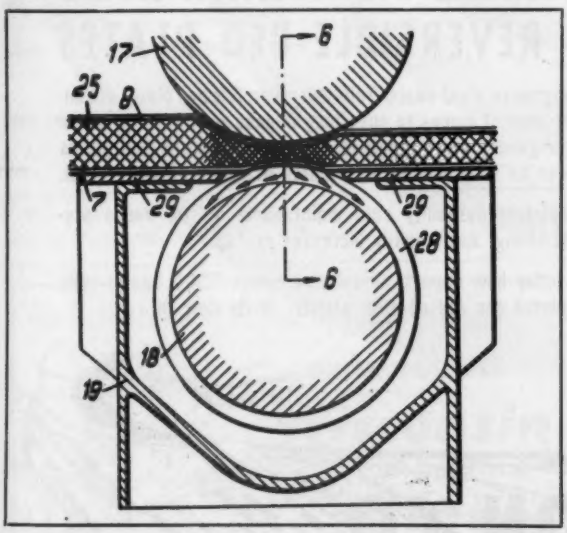


Fig. 3

In the present invention, however, as shown in Fig. 3, the water flows off at right angles to the sheet, and these problems are thus avoided. The advantages claimed by the inventor include the following:

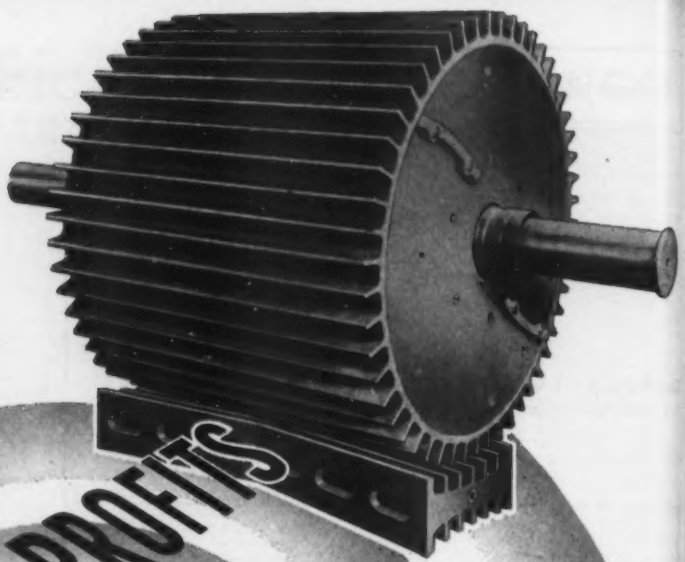
1. The speed of the machine can be increased, resulting in increased production.

2. The concentration of the fibrous mixture can be decreased, resulting in a stronger product.

3. The degree of grinding can be increased, which also increases the strength of the finished pressed product and makes possible the attainment of smoother surfaces.

Other Patents of Interest to the Pulp and Paper Industry

Subject	Inventor ar Assignee	Patent No.	Date
Machine for setting up collapsed cardboard cartons	Reinhold A. Pearson and Benny Weremiczyk	2,780,148	2/5/57
Papermaking machines	Beloit Iron Works	2,780,967&8	2/12/57
Manufacture of tubular bags and envelopes	John Dickinson & Co.	2,780,969	"
Machine for setting up bottle cartons	Atlanta Paper Co.	2,780,970	"
Bottle carrier with reinforced handle	Bergstein Packaging Trust	2,781,150	"
Automatic double wall carton	Bradley & Gilbert Co.	2,781,160	"
Gusset-type bag	Richard E. Adams	2,781,161	"
Carry bag	Wolf Brothers Inc.	2,781,162	"
Cylinder paper machine	Sand Hill Iron & Brass Works	2,781,699	2/19/57
Paper machine	Sandy Hill Iron & Brass Works	2,781,700	"
Paper hot drink cup and holder	Theodore Eron	2,782,616	2/26/57
Secondary headbox	Valley Iron Works	2,782,692	"
Press roll assembly for paper machines	Dominion Engineering Works Ltd	2,782,693	"
Intermittently operating apparatus for making bags	Continental Can Co. Inc.	2,782,694	"
Automatic machine for cutting to size from a roll of corrugated paper, smooth cardboard	S.A.F.F.A. - S.P.A. Fabbriche Fiammiferi ed Affini	2,782,852	"
Cellular filler for cartons	Bloomer Bros Co.	2,782,951	"
Box and box blank	Bestpak Inc.	2,782,977	"
Protector for boxed footwear	Benn Karr	2,782,978	"
Folding paper tray	Robertson Paper Box Co.	2,782,979	"
Carton for ice cream	Swift & Co.	2,782,980	"
Cardboard box	Somerville Ltd.	2,782,981	"
Reinforced easel construction for folding boxes and display panels	Marshall I. Williamson	2,783,013	"
Handled open end can carton	Paper Strap Inc.	2,783,690	3/ 5/57
Bottle ejecting mechanism for paper container making machines	Bruno A. Wittkuhns and Gilbert F. Hill	2,783,691 & 2,783,694	"
Production of protective cartons	The Bradley & Gilbert Co.	2,783,692	"
Fiber blank folding machine with adhesive heating attachment	American Can Co.	2,783,693	"
Production of composition board	Moller Hofft Inc.	2,783,784	"
Lined folding boxes	Marshall I. Williamson	2,783,876	"
Molded pulp valve tray and package	Keyes Fibre Co.	2,783,879	"
Carrying carton	Chicago Carton Co.	2,783,916	"
Cigarette carton	Patrick P. Delaney	2,783,929	"
Fiberboard end structures for shipping boxes	The Baltimore Paper Co.	2,783,930	"
Foldable carton	John Golden and George W. Flanders Jr.	2,783,931	"
Cake lift	William P. Frankenstein	2,783,932	"
Containers having Flap Holddown Means	The Eddy Paper Corp.	2,783,933	"
Closure for containers	Secretary of the Army	2,783,934	"
Inlet for papermaking machine	Beloit Iron Works	2,784,651	3/12/57
Paper machine dryer assembly	Beloit Iron Works	2,784,652	"
Machine for chipping wood	Mobelfabrik Westfalia H. Rottmann	2,784,753	"
Shirt collar support	Para-Lux Products Co.	2,784,886	"
Grocery shopping bags	Arron R. Chisholm	2,784,890	"
Dispensing top closure assembly for containers	American Can Co.	2,784,892-4	"
Pastry mailing container	William H. Linwood Jr. and Barbara V. Holland	2,784,895	"
Packet container	Roderick W. Hoag	2,784,896	"
Egg container	Aron Braunstein	2,784,897	"
Folding paper box	Thomas George	2,784,898	"
Storage and shipping receptacle	N. Russell Cronquist	2,784,899	"
Container construction	Robert E. Bauer	2,784,900	"
End closure for container	Oswego Falls Corp.	2,784,901	"
Apparatus for assembling, impregnating and delivering containers of paper or cardboard	Jagenberg-Werke A. G.	2,785,610	3/19/57
Paper tube	Pennsylvania Papyrus Corp.	2,785,700	"



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NEW PRODUCTS

These items are numbered for your convenience. Further information on the various products described may be requested at no obligation through our Readers' Service Dept. Use the business reply card in this issue.

Gage glass cleaning tool

This new cleaning tool uses brushes to quickly and efficiently clean the inside of liquid-level gage glasses.

The tool consists of a stainless steel rod with a bronze T handle operating inside a stainless steel tube. The wiping mechanism consists of two commercially available brushes which screw into a holding plate. *Jerguson Gage & Valve Co.*

Circle No. 12 on Readers' Service Card

Calculator for determining pipe friction losses

A handy pocket slide calculator for figuring water pipe and paper stock pipe friction losses is available by request on company letterhead.

Data for computing water pipe friction loss are based on standards of the Hydraulic Institute and appear on one side of the calculator, while those for determining paper stock pipe friction loss are on the other side. *Allis-Chalmers Mfg. Co.*

Circle No. 13 on Readers' Service Card

Lift check valve

An all-polyvinyl chloride lift check valve is now on the market in commercial quantities.

The valve will operate in either a vertical or horizontal position and will open and close under less than 6 lb. of pressure.

Sizes available in this valve are ½ in., ¾ in., 1 in., 1¼ in., 1½ in., 2 in. and 3 in. *Tube Turns Plastics Inc.*

Circle No. 14 on Readers' Service Card

Solving motor and drive troubles

One of the problems facing the company engineers during a recent modernization program was to find a solution to the excessive maintenance and replacement costs on five distributor roll drives in the headbox on the wet end, and to provide both clockwise and counterclockwise rotation for the two slice box rectifier rolls. Daily washdown of equipment with high pressure hoses and high humidity during operation necessitated compact, fully-enclosed drives.

The company found it more practical and economical to use one Oilgear-type "DP" one-way variable displacement pump with automatic power-saving control to supply fluid power to five Oilgearducers direct connected to the distributor rolls. A separate speed control was provided to each distributor drive so that the operator could vary the speed of each roll to suit the paper processed.

The drives are completely sealed and automatically lubricated by the oil in the system. The pump and constant speed electric drive motor were installed in the basement away from the danger of contamination.

The photo above shows five Oilgearducer drives direct connected to distributor rolls. *Oilgear Co.*

Circle No. 11 on Readers' Service Card

Wire stitching

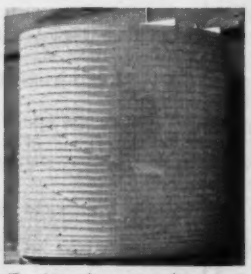
The company offers a new box stitching method in which stitches are cut and formed from a continuous coil of wire, driven into both outer and inner flaps of fibreboard boxes and clinched inside the inner flap without any mechanism entering the box.

This stitching method is done by the company's new N6 series box stitching machines now being offered. *Acme Steel Co.*

Circle No. 15 on Readers' Service Card

Pneumatic control valves

An 18-in. pneumatic rubber pinch valve, which was designed to handle solids in



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Moisture range from _____% to _____%

Name & Title _____

Firm _____

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suspension and to stand up under abrasive use, is now available. The valve is available in a range of sizes from ¼ in. to 36 in.

The company states that this valve is the largest ever produced in the world and has been in service in a paper mill for more than six months. During this six months the valve has shown unobstructed through-flow characteristics. Paper stock does not dewater, since the valve closes dead-shut even with a large-size wood knot trapped in the sleeve.

The drawing above shows a cross-section view of the principle of operation. *Red Jacket Co. Inc.*

Circle No. 16 on Readers' Service Card

Resin emulsion glue

A high-strength, clean machine polyvinyl acetate resin emulsion glue has been developed.

It is completely dextrine-compatible and can therefore be interchanged with any borated alkaline dextrine adhesive without machine shutdowns to clean the glue box.

The product is known as E2131 and is white, non-foaming, has 2100 cps in viscosity, non-stringing, won't build up and has all the speed and strength expected. *Paisley Products Inc.*

Circle No. 17 on Readers' Service Card

Felt cleaning detergent

Unusually good results are said to be obtained in cleaning paper machine felts with a new liquid dispersing agent, Neovadine AL.

Neovadine AL is not a built-up cleanser but is a new kind of product which removes fillers, sizings, dyes and pitch and leaves the felt clean, soft, open and resilient.

Extensive mill trials with this detergent are showing better cleaning with less effort than by any other procedure. *Ciba Co. Inc.*

Circle No. 18 on Readers' Service Card

Aluminum roller conveyor

With the new aluminum roller gravity conveyor, firms working particularly in high-humidity conditions or involved in handling high explosive materials can realize the non-corrosiveness and non-sparking advantages of aluminum construction.

The company will send information and bulletin giving price list and specification tables at your request. *Rapids-Standard Co. Inc.*

Circle No. 19 on Readers' Service Card

Valves for corrosive services

Pictured above is the new Ni-Resist type 2 cast iron gate valve with type 316 stainless steel trim which is now on the market. The use of these materials have shown unusual resistance to corrosion and erosion in services that involve acids, salt and alkaline solutions, vapors or gases and other corrosive fluids. They will not discolor or contaminate products being carried in the line.

The company offers a bulletin which gives full information about the valves and more technical details of its construction. *Jenkins Bros.*

Circle No. 20 on Readers' Service Card

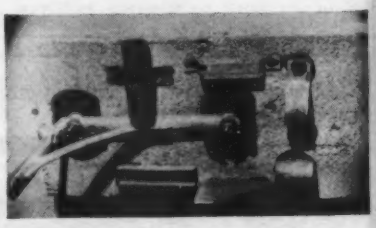
Portable utility fans

A new and improved line of portable utility fans is being offered to the industry.

This new group of all-purpose fans comprise five heavy-duty units for spot cooling, drying or processing in all types of portable or stationary applications.

All fans offered in this line may be ordered with two-, four- or six-blade "Macheta" airfoil propellers to fit their particular application. All are of heavy-gage steel construction with steel safety guards at front and rear. *Aerovent Fan Co. Inc.*

Circle No. 21 on Readers' Service Card



Resin for use on concrete

The picture above demonstrates the use of a new, easy-to-use alloy of micronized steel and epoxy resin called Steelpatch.

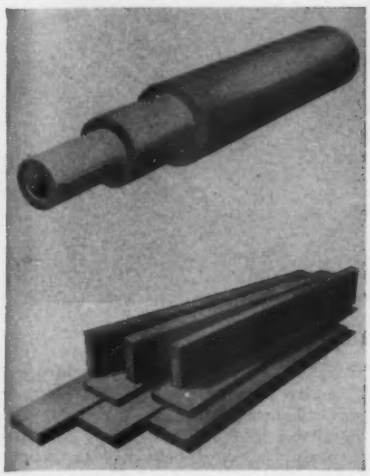
Steelpatch is being used for fastening conduit, piping, shelvingbrackets, wood, insulating and other materials to concrete without the use of tools.

A joint, when made, is unaffected by heat, moisture and most chemicals, and no

New Products . . .

heating or solvent-evaporation is required for complete cure. Steelpatch has also been successful in the repairing of broken machinery parts, repairing cracked engine blocks and pipe leaks. *Lockrey Co.*

Circle No. 22 on Readers' Service Card



Pipe and block insulation

Thermasil is the trade name given to a new line of pipe and block insulation for use with temperatures up to 1200° F.

The material is a hydrous calcium silicate compound, blended with other inorganic ingredients which are reinforced with long asbestos fibers. It is non-flammable and unaffected by water or excessive water vapor.

The photo above shows the pipe-type of insulation and the block-type. *Ebret Magnesia Mfg. Co.*

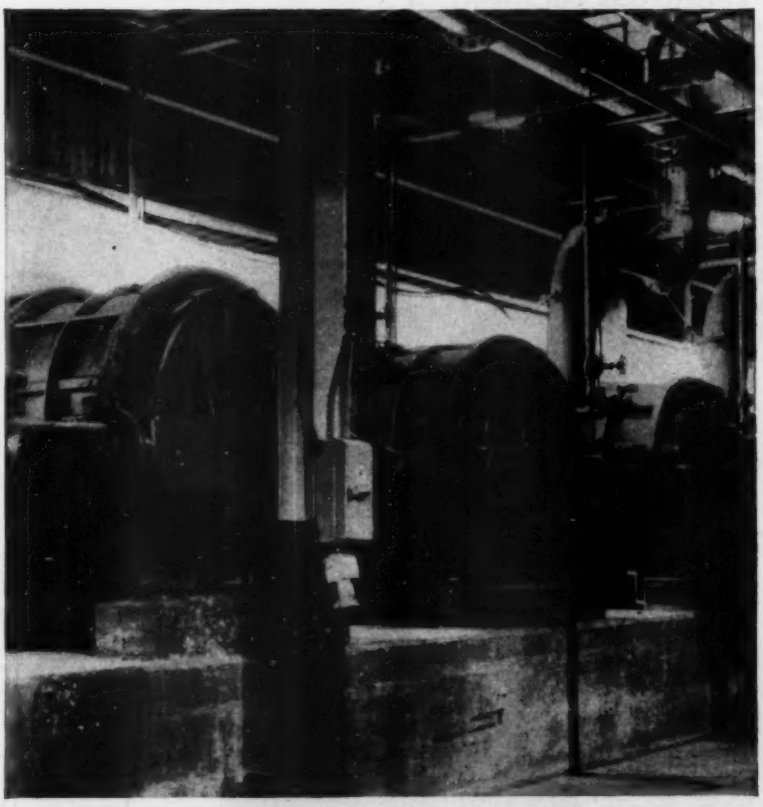
Circle No. 23 on Readers' Service Card

Magnesium yard ramp

The photo above shows a newly-designed portable ramp which permits freight car and truck loading where permanent dock facilities are not available, or where special loading problems necessitate a portable dock.

In use, the ramp is simply moved into position on its 16 in. dia. wheels. The upper end is raised to proper loading height by a manual hydraulic lift, and a positive locking device is secured in place

What, actually, do Vacuum Pumps on paper machines handle?



Paper mill engineers know that it is actually a mixture of air and water vapor, but the custom of rating vacuum pumps in terms of air capacity alone causes this important fact to be frequently overlooked.

The presence of this water vapor causes a considerable reduction of the effective air handling capacity of any vacuum pump except the Nash. In the Nash Vacuum Pump the bulk of this water vapor is effectively condensed, due to the Nash operating principle. The air handling capacity of the Nash is therefore not reduced.

That is one of the reasons why Nash Vacuum Pumps are standard in over a thousand leading Paper Mills.

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BUILT TO OPERATE AT ANY MACHINE SPEED

SYSTEMS ALSO BUILT FOR APPLYING SIZING MATERIALS, STARCHES, WAX EMULSIONS, PLASTICISERS AND OTHER SURFACE FINISHING SOLUTIONS

BUILT FOR MANUFACTURING OR CONVERTING PROCESSES

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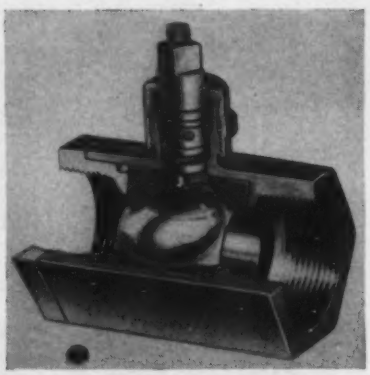
New Products . . .

— preventing the ramp from pulling away from the carrier during use.

The ramp is made of lightweight magnesium, which makes it extremely light and easily portable. One man can move and position the ramp. *Copperloy Corp.*

Circle No. 24 on Readers' Service Card



Ball valves

Three- and four-inch double seal ball valves now marketed offer a unique design. They have eliminated the valve bonnet, which was the primary cause of leakage.

The valves feature full-flow and quarter-turn operation and have currently wide application in the processing industries.

Complete data on these valves are available. *Jamesbury Corp.*

Circle No. 25 on Readers' Service Card

Aluminum stair tread

Designed for use in extreme weathering or corrosive atmospheres, this stair tread is made of die-cast aluminum.

As shown in the picture above, a non-skid quality has been built into the stair by means of a nosing of an abrasive tread plate.

Sizes now available range in lengths from 24 in. to 42 in. Width is standard at 10 in., but special widths are obtainable. *Alcoa Aluminum Co. of America.*

Circle No. 26 on Readers' Service Card

Variable flow rate pump-motor

A variable flow rate pump-motor set designed specifically for pilot plant, laboratory or process work where controlled and varying rates of flow of corrosive fluids and abrasive slurries are required is now available to the market.

The pump, driven by a variable speed source, offers a relatively linear relationship between speed and output.

Proportional flow, constant liquid level as well as other process variable control problems have been solved with this type of pump-motor system. The pumps are self-priming, and flow rates from fractional to 40 gpm are available. *Vanton Pump & Equipment Corp.*

Circle No. 27 on Readers' Service Card

Cooling roll surfaces

A new way to cool roll surfaces giving faster, more uniform cooling in operations of coating paper and conditioning plastic film is by a device called the Gross heat transfer insert.

This unit is a metal shell that slips inside the roll to be cooled. Flexible rubber ribs vulcanized to the shell press firmly against the roll and direct the flow

Type A centrifugal basic pump. Suction and discharge in lower half of casing.

45° A NEW SERIES
AURORA
TYPE A
Two Stage Diagonally Split Case
MULTI-PURPOSE PUMPS
45°

Suited to BOILER FEED, Hot or Volatile Liquids duties etc., etc.

• Low NPSH Characteristics •

Being Self-Venting, Will NOT VAPOR LOCK

MANY BENEFITS

45° split case offers substantial new advantages while retaining all of the best features of the horizontally split case pumps — in that the entire rotating element can be removed without disturbing piping or disturbing the pump-motor-base alignment. 45° split allows both suction and discharge to be in the bottom half of casing but above the center line of the pump.

Aurora Type AJ Centrifugal Pump with Water Cooled Bearings and Stuffing Boxes

WRITE FOR BULLETIN 1060S

DISTRIBUTORS IN PRINCIPAL CITIES

AURORA PUMP DIVISION
THE NEW YORK AIR BRAKE COMPANY

118 LOUCKS STREET • AURORA • ILLINOIS

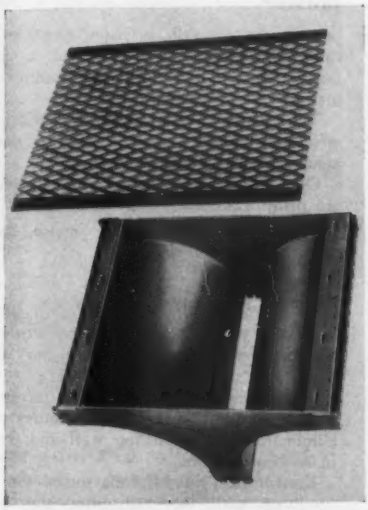
EXPORT DEPARTMENT — Aurora, Illinois — Cable Address "NYABINT"

New Products . . .

of cooling water in spirals. This spiraling action leads to very high velocities of the cooling water. Speed of the water carries off the heat faster.

A bulletin offered by the company gives a more technical and informative description of this unit. Diagrams and photos are also given. *F. R. Gross Co. Inc.*

Circle No. 28 on Readers' Service Card

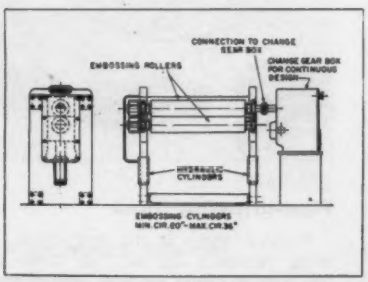


Vertical tee-fittings for cable trough

A new fitting to provide continuous metallic contact between vertical and horizontal runs of cable trough has been announced.

This new fitting permits the cables to be continously protected when they are changed from a horizontal to a vertical run and when in the same run other cables continue in the horizontal section. Cables from a vertical run can be dropped in either direction into horizontal runs. *T. J. Cope Inc.*

Circle No. 29 on Readers' Service Card



Hydraulic embossing unit

The drawing pictured above gives a diagram of a new heavy-duty hydraulic embossing unit with a 10-ton rated capacity for both "in register" and "over-all" embossing. This unit handles web materials ranging from paper and paper-backed foil to light paperboard.

Four models are available in the embossing unit. They are: Model 20 in., which has a web width of 21 in.; model 27 in., with web width of 28 in.; model 36 in., with web width of 37 in., and model 44, with a 45 in. web width. *Champlain Co. Inc.*

Circle No. 30 on Readers' Service Card

Titanium valve

An announcement has been made to introduce a titanium valve which is now in production and ready for commercial use.

This valve was designed specifically for use in high-corrosive operations. It has been tested to be virtually corrosion-free.

The 6-in. DiFab wedge-gate valve is 24 in. high and weighs about 60 lb. *Fabri-Valve Co. of America.*

Circle No. 31 on Readers' Service Card

Unit to reduce smoke and soot

A unit called the Boston Air Preheater is stated to give a marked reduction in smoke and soot and a fuel savings of up to 25 per cent.

The preheater, usually installed in the fire door of the boiler, supplies preheated secondary air over the fire bed or burners for maximum combustion of the fuel. It is designed for use with low- or high-pres-

"From ingot to fourdrinier wire"

QUALITY-CONTROL THROUGH THE LABORATORY

Shown here is a small section of our laboratory, which is housed in its own building and is completely equipped with the most modern instruments.

Its staff is dedicated to a two-fold purpose:

1. *Quality control during every phase of fourdrinier wire manufacture.*
2. *Constant study, research and evaluation for future progress.*

From the raw metals to your finished fourdrinier wires, we are proud to say they are *truly ours*—scientifically controlled from the ingot to the finished product.

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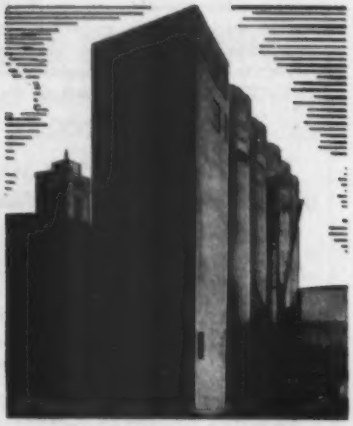
Belleville, N. J.



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Equip Your Digester House with a

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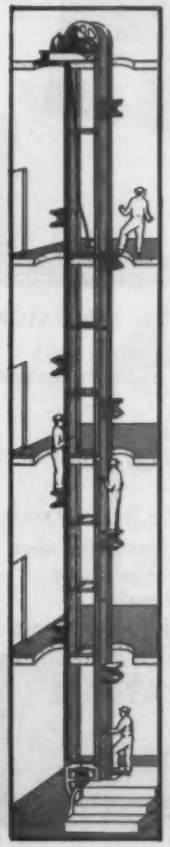
Employee's Manlift

ELEVATOR

Eliminate stair climbing—save time—reduce employee fatigue. The endless belt provides continuous up and down transportation to and from sampling and operating floors. Easy and safe to operate with ready-at-hand stop and go controls and the exclusive Humphrey Safety Features.



Can be Installed in any Multiple Floor Building

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Faribault, Minnesota

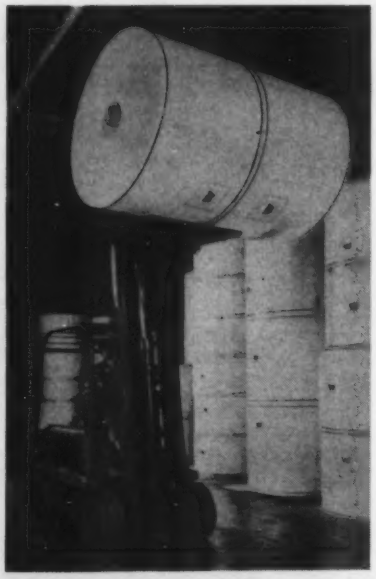
Humphrey is the original Manlift Elevator, made continuously since 1887.

New Products . . .

sure, oil-, coal-, or coke-fired boilers of the induced-draft, forced-draft or steam-blast type.

The drawing above gives a cross-sectioned view of an installed unit. The company invites your request for information on the unit. *Preheater Corp. of America.*

Circle No. 32 on Readers' Service Card



Revolving paper roll grab

The photo above shows a new paper roll grab in operation.

Equipped with the powered-swinging arm, the driver no longer dismounts to position the arm for different roll sizes. Pilot-operated check valves assure positive clamping pressure until the load is released. Contact pads are covered with durable, high-friction surface. *Cascade Mfg. Co.*

Circle No. 33 on Readers' Service Card

Detergent for cleaning equipment

Oakite LSD is a new liquid detergent designed for use in solution lifting steam guns and self-generating steam cleaning equipment.

The detergent is said to provide effective soil removal at concentrations of 1 to 2 ounces to each gallon of water as delivered by the gun. *Oakite Products Inc.*

Circle No. 34 on Readers' Service Card

Recorder for measuring speed

Measuring and recording of speed with an accuracy of plus or minus 0.1 per cent is made possible by a newly-developed instrument.

The instrument was designed for use with General Electric's dc tachometer generators and can be calibrated in rpm, fpm or other similar units to fill many speed measuring requirements in the paper industry.

A variation of this instrument records per cent deviation from a desired speed with the same plus or minus 0.1 per cent accuracy if such measurement is preferred. *General Electric Co.*

Circle No. 35 on Readers' Service Card

Coating for masonry and plaster

Amercoat No. 88 is name given to a new PVC latex coating designed to give lasting protection to walls and ceilings of masonry and plaster.

The coating resists chemical attack and effectively seals plaster and masonry against water vapor penetration.

One dozen harmonizing pastel colors are made available. *Amercoat Corp.*

Circle No. 36 on Readers' Service Card

Measuring sewage flow

A new Parshall flume meter which can accurately measure sewage flow has been developed.

The company states the unit measures with extreme accuracy and features the elimination of the stilling well and cover in its construction.

Known as Type ML, the meter will be produced with the transmitter and float mechanism custom made to suit the established dimensions of Parshall flumes and designed to measure flows in accordance with published Parshall flume flow data. *Burgess-Manning Co.*

Circle No. 37 on Readers' Service Card

Pipe-gripping chuck

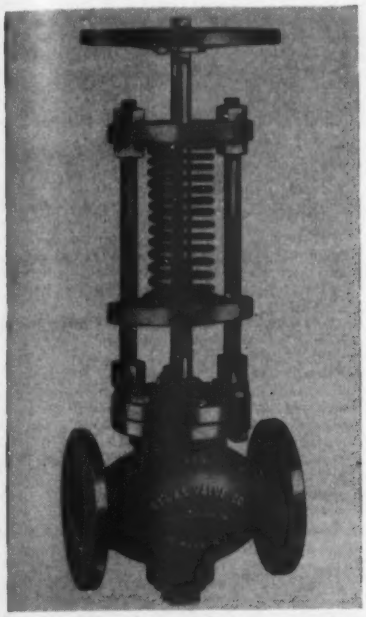
Pictured above is the new chuck now being furnished on all 2-in. Oster pipe and bolt threading machines which revolve the work.

Known as the Power-Matic, this new universal gripping chuck is operated by a hand wheel and requires no bars or tee

wrenches to grip the work securely for cutting both right- and left-hand threads.

The insert jaws are easily removable for sharpening or replacing without removing the entire jaw body. *Oster Mfg. Co.*

Circle No. 38 on Readers' Service Card



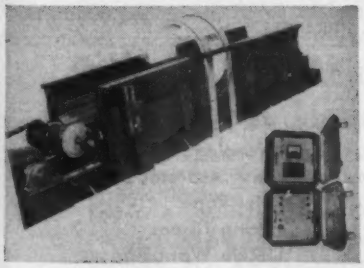
Spring-loaded relief and back pressure valve

A spring-loaded relief and back pressure valve has been designed to function on both condensing and non-condensing systems.

In condensing systems, this valve is used to maintain constant back pressures in the exhaust line from an auxiliary engine or turbine. On the condenser of any auxiliary equipment it functions as a relief valve if the vacuum is lost.

In non-condensing systems, the valve serves as a back pressure control valve. *Atlas Valve Co.*

Circle No. 39 on Readers' Service Card



Foreign metal detector

Metal-Matic detector is the name given to the unit pictured above.

This unit is installed on a conveyor line. When foreign metal passes through the conveyor, it causes a horn or bell to sound and a dye sprayer to mark the general area on the log containing the metal. There is also an accessory that stops the conveyor.

The use of this unit prevents damage to knives and saws caused by foreign metal. It will also operate when partially submerged in the log pond, since it is completely enclosed and protected from dirt and moisture. *Soderhamn Machine Mfg. Co.*

Circle No. 40 on Readers' Service Card

Safety solvent cleaner

SS-25 is a new safety solvent being used as a replacement for toxic solvents in cleaning machines.

The company states that it is much safer than carbon tetrachloride and has no flash at the boiling point.

The cleaner leaves no odor, evaporates rapidly and completely, leaving no residue, is non-corrosive and safe for human skin. It may be sprayed, brushed or wiped on the surface to be cleaned. *National Disinfectant Co.*

Circle No. 41 on Readers' Service Card

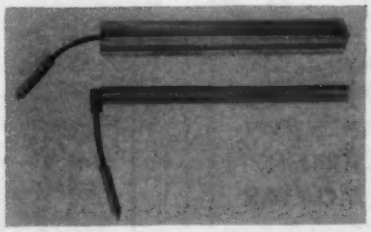
Plasticizer and surface active agent

Research has shown that this new product of sugar chemistry has excellent utility as a crosslinking agent for polyurethane foams prepared from polyglycols. Hyprose SP80, as it is called, may be added after the prepolymer reaction to produce low-density foams with high-bearing characteristics and good resiliency.

As a plasticizer, the new chemical may be used in paper, cellophane and methylcellulose.

A bulletin and samples for polyurethane and plasticizer are available from the company. *Dow Chemical Co.*

Circle No. 42 on Readers' Service Card



Static bar

A new static bar, called the Super Service Static Bar, is now on the market.

In addition to having maximum neutralizing efficiency, it has been designed to require no maintenance other than an occasional brushing or blowing off of the points.

Because of its construction, nothing can fall inside the bar to short-circuit it internally — thus making it especially adaptable to use in dirty locations. *Simco Co.*

Circle No. 43 on Readers' Service Card

POIRIER

Extraction Systems

Reduce Costs

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Increase Production

•

More Uniform Sheet

•

Here's how: —

- Automatically provides correct vacuum at all suction boxes.
- Eliminates large suction pumps and costly maintenance.
- Provides longer wire life.
- Makes possible working of more water into the sheet.
- Scrutinizes every inch of sheet.
- Assures proper amount of air coming through sheet at dry boxes.
- Operates automatically regardless of stock weight or grade.
- Assures correct moisture content in sheet at the dandy.

These are just a few of the reasons why a Poirier Baromatic Syphon System is so popular. It will help you too.

Write for full information today.

POIRIER CONTROL COMPANY

Waterville 9, Maine

Specialists in Stock Control Equipment

NEW LITERATURE

Manufacturers' Publications

These items are numbered for your convenience. Copies of the publications may be requested at no obligation through our Readers' Service Dept. Use the handy business reply card which accompanies this issue.

Large displacement lubricators

Bijur Lubricating Corp. Instructions for servicing and operating large displacement lubricators actuated by a moving machine element are included in a 2-page service instruction sheet now offered by the company.

Circle No. 44 on Readers' Service Card

Variable speed belts

Worthington Corp. is offering a new bulletin containing information about the features of the company's variable speed belts.

Circle No. 45 on Readers' Service Card

Air compressors

Brunner Mfg. Co. A new data sheet listing construction details, specifications and models of air compressors in the ¾ to 20 hp range has been published by the company. It provides data useful in selecting the right compressor for the specific job in the industry.

Circle No. 46 on Readers' Service Card

Industrial gearing

Westinghouse Electric Corp. "Industrial Gearing" is the title of a new booklet now available from the company. It outlines the design facilities and manufacturing capacity of the Westinghouse gearing division. A complete machinery listing is also included.

Circle No. 47 on Readers' Service Card

Lumber handling

Clark Equipment Co. shows handling techniques for pulpwood, logs and raw and finished lumber in storage yards, at mills, in drying areas in processing plants and in warehouses in its new 16-page pocket-size booklet. This booklet shows the company's high-capacity fork-lift trucks and carriers for these applications.

Circle No. 48 on Readers' Service Card

Worm gear drives

Cleveland Worm & Gear Co. Finger-tip facts on the company's worm gear drives are covered in a new 16-page illustrated brochure. It provides useful summary information on the complete standard line of speed reducers, worm gear sets and special units manufactured by the company.

Circle No. 49 on Readers' Service Card

New type of circulating oil system

Farval Corp. describes "Lubrival", a new type of circulating oil system developed by the company. This new system monitors its own operation through a pressure-sensing mechanism to warn of clogged or broken lines in any part of the system and is equipped with built-in return oil arrangements. The entire system is covered in an 8-page brochure.

Circle No. 50 on Readers' Service Card

How to make a motor go

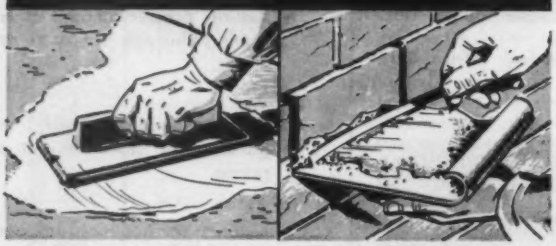
Allis-Chalmers Mfg. Co., who recently made two slide films—"How to make a motor go and go" and "How to take step seven", has converted these films into literature form. The contents describe how to get the best performance from motors by giving them the proper care and maintenance. Both bulletins will be sent at your request.

Circle No. 51 on Readers' Service Card

Fire protection systems

Automatic Sprinkler Corp. of America has printed a bulletin giving a complete discussion

Save Time...
Have Lasting Concrete Repairs



Patching concrete floors. Tuck pointing masonry.

Ready-to-Use, **NON-SHRINK**
EMBECO PRE-MIXED MORTAR

... Eliminates assembling, proportioning of materials. All ingredients accurately proportioned, thoroughly blended.

... Provides durable repairs because it (1) does not shrink upon hardening, (2) bonds tightly to old concrete and mortar, (3) has higher early and ultimate strength, (4) is dense, resists water and oil penetration.

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Lindsay & Niagara Wires
Knox Woolen Felts
Cotton & Asbestos Dryer Felts
Carrier Rope
Splicing Tissues
Deckle Webbing
Apron Cloth
Wire Brushes

of the nature and advantages of fire protection systems. The bulletin, titled "The ABC of Fire Protection", shows the complete range of fire protection components and systems manufactured by the company. Other important facts on the need for fire protection systems are also given.

Circle No. 52 on Readers' Service Card

Heat exchangers

Condenser Service & Engineering Co. Inc. has revised its catalog, which shows the equipment and service offered by the company. The catalog gives technical details on the heat exchangers and also includes graphs, photos and other data on the service which the company offers.

Circle No. 53 on Readers' Service Card

Air conditioning units

Worthington Corp. announces the availability of a 36-page bulletin on its new Multi-zone air conditioning units. The bulletin is graphically illustrated and contains specification data and physical data on the units.

Circle No. 54 on Readers' Service Card

The Portland Copper story

Portland Copper & Tank Works Inc. has prepared a 16-page brochure outlining the operations and services of the company. The illustrated booklet reviews company history and operating methods and describes technical advances made by the company in connection with its work for the pulp and paper industry as well as other industries.

Circle No. 55 on Readers' Service Card

A theory of cellulose stabilization

Upson Chemical Corp. covers the development of new chemical compositions for dimensional stabilization of paper and other forms of cellulose. A technical explanation of the theory and principles of cellulose stabilization covers the use of monoester and other partial esters of polyhydric alcohols and polycarboxylic acids.

Circle No. 56 on Readers' Service Card

Dextrine-compatible resin adhesive

Paisley Products Inc. offers a laboratory report describing dextrine-compatible resin adhesive. The report describes the properties and method of application along with other findings. The new adhesive is called E-2131.

Circle No. 57 on Readers' Service Card

Motors and drives

Reliance Electric & Engineering Co. has described in photos and texts its complete line of ac and dc motors, gearmotors, motor-generator sets, motor controls and complete packaged mechanical and electronic adjustable-speed drives.

Circle No. 58 on Readers' Service Card

How to obtain longer V-belt life

Allis-Chalmers Mfg. Co. This bulletin describes various types of V-belts and tells how to select and match them. It lists seven steps for the correct installation of belts and offers as many hints for making them last longer. This information given in the bulletin is applicable to all types of V-belts manufactured today.

Circle No. 59 on Readers' Service Card

Stainless pipe and tubing

Trent Tube Co. has a new catalog available at your request. The catalog covers the company's line of stainless and high-alloy pipe and tubing from ⅛-in. to 40-in. O.D. The booklet is also well illustrated to show application.

Circle No. 60 on Readers' Service Card

Radiation gauging handbook

Tracerlab Inc. has made available its first comprehensive technical handbook on radiation gauging. The 36-page book is designed to be used by technical people involved in gauging sheet materials of all types and consists of basic information about radiation gauging on a wide variety of materials.

Circle No. 61 on Readers' Service Card

More wood with less men

American Pulpwood Association has published Release No. 298 of its Equipment Handbook. This release is titled "More wood with less men through closer utilization". This report was presented by J. A. Holekamp at the annual meeting in Baltimore, Md., on February 16.

Circle No. 62 on Readers' Service Card

Manual of laboratory safety

Fisher Scientific Co. has compiled a compact, pocket-size, fully-illustrated manual on laboratory safety. The manual covers accident prevention, first aid, fire prevention and safety equipment and concludes with a safety bibliography. The company invites your requests for free copies of this manual.

Circle No. 63 on Readers' Service Card

Hardwood pulping in the Northeast

Northeastern Wood Utilization Council has available a report titled "Hardwood pulping in the Northeast". This report discusses the practical aspects of pulping hardwood in the Northeast and is the result of a conference held at Amherst, Mass., on September 14. The price of this booklet is $2.00.

Circle No. 64 on Readers' Service Card

Control systems

Industrial Nucleonics Corp. This company has published a new 12-page booklet entitled, "AccuRay Basis Weight Control Systems for the Paper Industries". The booklet describes the system as used to automatically measure and

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Sulphite Mill Acid Plants
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For Bleach Plant Application—Sulphurous Acid Preparation
COMPLETE DESIGN AND INSTALLATION

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REMINDER
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Stock Level Control provides:

1. Instant response to either small or sudden large changes in stock level
2. Sufficient power to actuate largest and heaviest valves
3. Operation of minimum and maximum flow valves in sequence
4. Unlimited turndown
5. Lowest maintenance cost for any stock level control element

For *complete* information on what it does, where and how it can be applied, and how it works, send for bulletin Nos. 165 and 26.3. Write Askania Regulator Company, 294 East Ontario Street, Chicago 11, Illinois.

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"CONTROLS FOR INDUSTRY"
HYDRAULIC, ELECTRONIC CONTROLS & SERVOS, GENERAL SYSTEMS, ENGINEERING & COMPUTER SERVICE, VALVE ACTUATORS & CYLINDERS
A SUBSIDIARY OF

control basis weight of bond, publication, glassine, newsprint, kraft and asbestos.

Circle No. 65 on Readers' Service Card

Fire detectors

Fenwal Inc. A 4-page brochure describing the various horizontal and vertical models available, states physical and electrical specifications and gives sets of graphs for comparing response temperatures for various types of detectors under dynamic ambient conditions.

Circle No. 66 on Readers' Service Card

Recorder totalizer

Standard Instrument Corp. New features of this instrument are described in this bulletin. The instrument is an ideal tool for the accurate accumulation of data on the operation of any machine process or system in the plant, laboratory or office.

Circle No. 67 on Readers' Service Card

Belt conveyor idlers

C. O. Bartlett & Snow Co. A new 8-page bulletin describes the complete line of belt conveyor idlers including troughing, flat, self-aligning, rubber disc and return designs. Construction, standard size list, dimensions, weights, etc. are also given.

Circle No. 68 on Readers' Service Card

Embossing unit

Champlain Co. Inc. describes five important features in the company's new heavy-duty hydraulic embossing unit in a data sheet now offered.

Circle No. 69 on Readers' Service Card

Pulpstones

Norton Co. Details on construction, operation and maintenance of pulpstones are covered in a 32-page booklet titled, "Norton Pulpstones for the Pulp and Paper Industry". The booklet includes charts, photos and complete information on the pulpstones.

Circle No. 70 on Readers' Service Card

PVC pipe, valves and fittings

Joseph T. Ryerson & Son Inc. A catalog containing the line of PVC pipe, valves and fittings is available from the company. The catalog also gives price listings and diagramatic drawings.

Circle No. 71 on Readers' Service Card

Pipe insulation

Baldwin-Hill Co. gives complete specifications for Nono-Kover—a slit, one-piece, sectional-type, molded mineral wool pipe insulation that snaps into place—in a bulletin just published. Installation drawings are also given.

Circle No. 72 on Readers' Service Card

Centrifugal pumps

Byron Jackson Co. has printed five bulletins giving complete descriptions of various types of centrifugal pumps manufactured for the paper and pulp industry. The company invites your requests for all five bulletins.

Circle No. 73 on Readers' Service Card

Report to the people of Ontario

Ontario Forest Industries Association has printed the fourth pamphlet in a series being issued on the forests of Ontario. This pamphlet, No. 4, deals with forest management on Crown lands in Ontario.

Circle No. 74 on Readers' Service Card

Relief valves and pressure valves

Milton Roy Co. describes its line of chemical relief valves and back pressure valves in a 4-page bulletin which is now available. Complete specifications, including capacities of four standard sizes—¼, ½, ¾ and 1 in., are included, along with dimensions and materials of construction.

Circle No. 75 on Readers' Service Card

Laboratory instrumentation

Beckman Instruments Inc. is offering a 12-page booklet of informative news and pictures featuring stories on laboratory instrumentation. You will read about two new products, the Zeromatic and pocket pH meters, and the DK-2 spectrophotometer.

Circle No. 76 on Readers' Service Card

Semi-pressure fans

Aerovent Fan Co. Inc. describes and illustrates the company's new "SP-7" semi-pressure fans in a bulletin. The bulletin discusses how this fan is used for efficient performance against static pressures normally considered above the range of propeller-type fans.

Circle No. 77 on Readers' Service Card

Pumps and valves

Hills-McCanna Co. has given the title, "Positive Flow Control" to its newly published catalog describing the company's proportioning pumps and diaphragm valves. Materials of construction, capacities and pressures are shown for each model.

Circle No. 78 on Readers' Service Card

Industrial trucks

Baker-Raulang Co. invites your requests for a 12-page bulletin describing the company's complete line of industrial trucks. This bulletin includes data on construction features and describes and pictures special attachments which are available and tables of specifications.

Circle No. 79 on Readers' Service Card

Short-coupled vertical service pumps

Layne & Bowler Inc. has just released a six-page bulletin describing Layne short-coupled vertical service pumps. It explains the many uses of the pump including suggested installation plans, existing installations for pipe lines, municipal and private water works systems.

Circle No. 80 on Readers' Service Card

Pneumatic control instruments

Bristol Co. is offering a new bulletin on pneumatic control instruments. The 44 pages of the bulletin describe the features of the company's line of Series 500 recording and indicating controllers in simplified terms and illustrations.

Circle No. 81 on Readers' Service Card

PAPER AND PAPERBOARD MAKING

By HARRY WILLIAMSON

Consulting Engineer and Author of

LESSONS IN PAPER MAKING

Pocket size, cloth bound text book of 372 pages covering all phases of stock preparation and sheet formation including the fundamental principles of making paper on the fourdrinier machine and paperboard on the multiple cylinder machine.

The author has fulfilled a life-long ambition to translate nearly fifty years of practical experience in a book that will be useful to the practical papermaker, technologist and executive.

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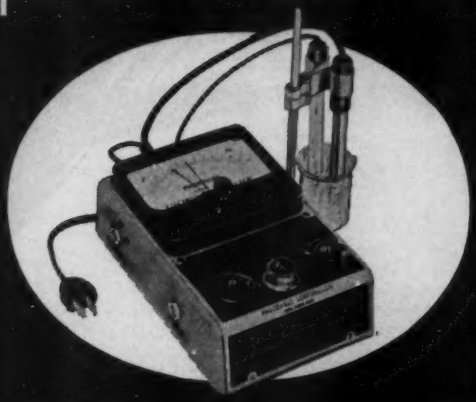

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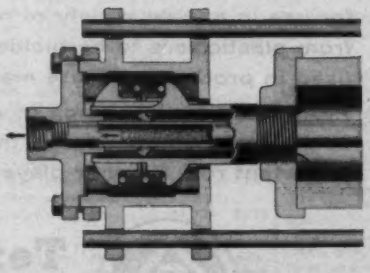
The Type LJ Johnson Joint has lugs cast right on the body to accommodate supporting rods. This design lifts the weight of the body from the rotating assembly—permits it to "float" freely inside. Joint shown at left is for syphon pipe service, has steam inlet in side of body 90° from lugs. Type LJ is also available for thru flow service.



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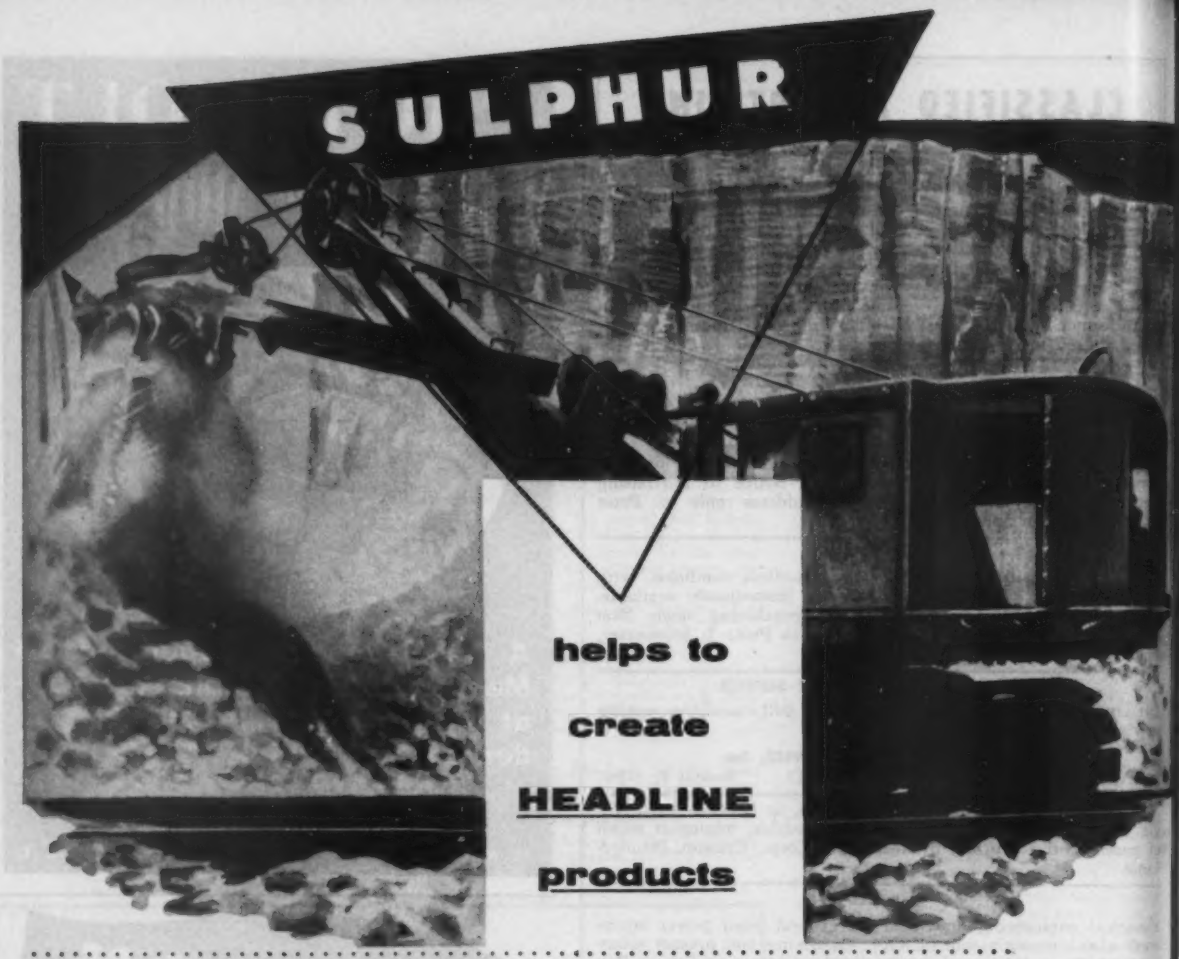

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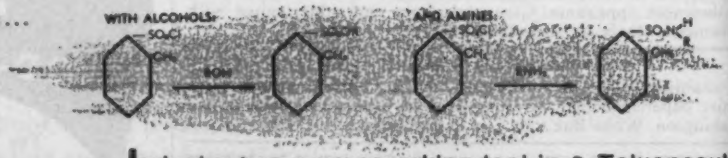

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MARKET QUOTATIONS

RAGS (Domestic)

New Cotton Cuttings

The following are brokers' and large dealers' average buying prices for sizeable lots in cents per pound f.o.b. New York:

	per cwt.	
No. 1 white shirt cuttings	13.00—	13.50
Soft unbleached muslins	15.50—	16.00
Fancy shirt cuttings	4.50—	5.00
No. 1 percales	5.50—	6.00
No. 1 washables	2.25—	2.50
No. 1 light silesias	6.50—	7.00
No. 1 light prints	4.75—	5.00
Light flannelettes	6.50—	7.00
Cottonades	2.75—	3.25
Blue overall cuttings	6.75—	7.25
Blue cheviots	6.75—	7.25
Canton flannels, bleached	10.50—	11.00
Canton flannels, unbleached	10.50—	11.00
Osnaburg cuttings	9.50—	10.50
Underwear cuts, bleached	14.50—	15.00
Underwear cuts, unbleached	14.50—	15.00
Sun tan khaki cuttings	5.00—	5.50
American linen cuttings	6.75—	7.25

Cotton Rags

The following are prices, cents per pound, paid by dealers and brokers f.o.b. New York:

	per cwt.	
No. 1 roofing (Chicago)	.80—	.85
No. 2 roofing (Chicago)	.60—	.65
Twos and blues, repacked	1.50—	1.75
Thirds and blues, repacked	1.50—	1.75
No. 1 whites, repacked	—	
No. 1 whites, miscellaneous	—	
No. 2 whites, repacked	—	
No. 2 whites, miscellaneous	—	

RAGS (Foreign)

(ex dock New York City)

New Rags

per cwt.

Nominal

New dark cuttings
New mixed cuttings
New light silesias
Light flannelettes
Unbleached cuttings
New white cuttings
New light oxfords
New light prints

Old Rags

per cwt.

Nominal

No. 1 white linens
No. 2 white linens
No. 3 white linens
No. 4 white linens
No. 1 white cottons
No. 2 white cottons
No. 3 white cottons
No. 4 white cottons
Extra light prints
Ordinary light prints
Medium light prints
Dutch blue cottons
French blue cottons
French blue linens
Checks and blues
Linsey garments
Bark cottons
Old shopperies

ROPE and BAGGING

F.o.b. and ex dock New York City

Gunny No. 1, domestic	—
Gunny No. 1, foreign	—
No. 1 manilla rope, domestic	—
No. 1 manilla rope, foreign	—
New burlap cuts (soft)	—
Sisal strings	—
Mixed strings	—

WASTE PAPER

The following are prices, dollars per net ton, paid by brokers and large dealers for carload quantities of baled stock, f.o.b. cars New York:

No. 1 hard white envelope cuttings	105.00—115.00
No. 1 hard white shavings	85.00— 90.00
No. 1 soft white shavings	50.00— 55.00
Soft white shavings, uncoated	55.00— 65.00
Fly leaf shavings No. 1	25.00— 30.00
Fly leaf, woody, No. 1	30.00— 35.00
Mixed colored shavings	18.00— 20.00
No. 1 books and magazines	17.00— 18.00
Ledger stock, white, No. 1 (carloads)	45.00— 50.00
Ledger stock, colored, No. 1 (Midwest ship)	25.00—
New manila envelope cuttings (free of groundwood)	60.00— 65.00
New manila envelope cuttings (containing groundwood)	50.00— 55.00
Manila tab cards	55.00— 65.00
Colored tab cards	40.00— 50.00
New all-kraft envelope cuttings	—
Triple sorted kraft, 100%	25.00— 30.00
No. 1 old kraft	25.00—
White news cuts, No. 1	50.00— 55.00
No. 1 overissue news	14.00— 16.00
Folded news, special	12.00— 13.00
Folded news, ordinary	9.00— 11.00
Old corrugated boxes	14.00— 15.00
New jute corrugated cuts	19.00— 20.00
Mill wrappers	9.00— 11.00
Boxboard cuttings	6.00— 7.00
No. 1 mixed paper	2.00— 3.00

CHEMICALS

F.o.b. New York City

Alum, ammonium	
Granular, bags, works, cwt.	4.30—
Lump, drums, works, cwt	5.05—
Powdered, drums, works, cwt	5.20—
1-Arginine, drums, kilo	74.80—
Blanc Fixe	
Direct process, bags, c.l., works, ton	110.00—
L. c. l., works, ton	120.00—
Bleaching Powder, drums, cwt	
Casein, domestic acid precipitated	
Standard, bags, 10,000-lb. lots or more, shipping point, lb	No Prices
Premium, bags, 10,000-lb. lots or more, shipping point, lb	No Prices
China Clay, domestic dry-ground, airfloat, 99%	
325-mesh, bags, c. l., Georgia works, ton	10.00—
300-mesh, bags, c. l., Georgia works, ton	13.50— 14.50
Imported, white, lump, bulk, c. l., ex dock Phila, Portland, Me., gross ton	20.00— 35.00
Chlorine, liquid	
Tanks, single units, works, freight equaled, cwt	3.15—
Glycerine, refined (CP, USP) 99%, drums, c. l., delivered lb.	.29½—
Litharge, commercial powdered	
Barrels, c. l., works, freight equalled, lb.	.17—
Rosin, gun, c. l., f.o.b. New York, cwt	
E	8.90—
F	8.90—
G	8.90—
WW	10.30—
Rosin, wood, c. l., f.o.b., shipping point, cwt.	
K, M	8.00—
N	8.10—
WG	8.60—
WW	8.90—
Saltcake, domestic, bulk Works, 100% Na_2SO_4, basis ton	28.00—
Soda Ash	
Dense, 58%, paper bags, c.l. works, cwt	1.90—
Light, 58%, paper bags, c. l. works, cwt	1.85—
Soda, caustic	
Flake, 76%, drums, c. l. works, freight equalled, cwt.	4.70—
Solid, 76%, drums, c. l. works, cwt.	4.30—
Sodium Silicate	
40°Be, 1:3, 2, turbid, drums, c. l., works, cwt.	1.55—
52°Be, turbid, 1:2, 4, drums, c. l., works, cwt.	2.65—
Starch	
Pearl, 140-lb. bags, cwt.	7.47—
Pearl, 100-lb. bags, cwt.	7.32—
Powdered, 100-lb. paper bags, cwt.	7.44—
Sulfur, crude	
Bulk, c. l. mine, contract, long ton	26.50—
Talc	
Domestic, bags, c. l. works, ton	—
Canadian, ground, bags, c. l. works, ton	20.00— 35.00
Titanium Dioxide	
Pigment, calcium-rutile base, regular, bags, c. l., lb.	.09¼—
High-tinting, drums, c. l., lb.	.09 —
Zinc Oxide Pigment, American process	
Lead-free, bags, c. l., freight allowed, lb.	.14½—
Leaded, 35%, bags, c. l., freight allowed, lb.	.15½—

WOOD PULP

Quotations on domestic and Canadian pulp, dollars per short air-dry ton delivered consuming mills including basic allowances, follow:

Bleached sulfite, No. 1	150.00—
Bleached sulfite, Canadian	150.00—
Unbleached sulfite	130.00—
Unbleached sulfite, Canadian	130.00—
Bleached soda	145.00—
Bleached soda, Canadian	145.00—
Kraft, bleached hardwood	150.00—
Kraft, bleached	152.00—155.00
Kraft, bleached southern	155.00—
Kraft, bleached Canadian	155.00—
Kraft, unbleached southern	117.50—122.50
Kraft, unbleached, Far West	125.00—
Kraft, unbleached Canadian eastern	130.00—
Kraft, unbleached Canadian western	120.00—125.00
Kraft, semi-bleached southern	140.00—
Sulfite screenings	72.50—
Sulfate screenings	67.50—
Groundwood, dom.	82.50— 90.00

Quotations on imported wood pulp, dollars per short air-dry ton on dock American Atlantic ports, follow:

Bleached sulfite, Swedish, freight allowed	150.00—
Bleached sulfite, Norwegian, del'd with limited freight allowance	150.00—
Bleached sulfite, Finish, freight allowed	150.00—
Unbleached sulfite, Swedish, freight allowed	130.00—
Unbleached sulfite, Finnish, freight allowed	130.00—
Kraft, unbleached, Swedish, freight allowed	125.00—
Kraft, unbleached, Finnish, freight allowed	125.00—
Kraft, bleached, Swedish, on dock	155.00—
Kraft, bleached, Norwegian	155.00—

PAPER

Quotations are mill quotations Chicago

Boards (prices per ton, delivered in Chicago, 10 tons or more):	
Plain chip	107.50
News vat lined chip	110.00
.009 chip, rolls	100.00
Filled news	111.50
Solid news	114.50
White vat lined chip	144.50
Chip tube and can stock	112.50
Single manilla lined chip	162.50
Single jute lined chip	147.50
Container, 42-lb.	
Kraft liner (per 1000 sq. ft.)	2.68
White patent coated	
.020	175.00
.018	177.50
.016	182.50
Book Paper (f.o.b. Chicago, c.l. cases per cwt):	
No. 1 enamels	20.05
No. 2 enamels	19.05
Machine-coated, 45- to 100-lb.	15.05— 18.50
60-lb. + uncoated offset, 25 × 38 (2000 lb.)	17.05
"A" grade English finish untrimmed, 25 × 38 (2000 lb.)	16.15
Rag Content Bond (white, 5000 to 10,000-lb. sub 20, ream sealed cartons):	per cwt
100% rag	63.20
75% "	48.45
50% "	36.95
25% "	31.00
Rag Content Ledger (white, 5000 to 10,000-lb., ream sealed cartons):	
100% rag	64.40
75% "	49.60
50% "	38.10
25% "	32.20
Sulfite Bond (white, 5000 to 10,000-lb. sub 20, ream sealed cartons):	
No. 1	22.50
No. 2	21.75
No. 4	20.35
Sulfite Ledger (white, 5000 to 10,000-lb., ream sealed cartons):	
No. 1	23.70
No. 2	22.95
No. 4	21.55
Newsprint (contract base price)	per ton
Rolls, standard	135.00
Sheets	Standard differentials
Tissues (carlots)	per ream
White No. 1	
White No. 2	
Bleached anti-tarnish	
Colored	
Anti-tarnish kraft	
Manila	
Napkins, semi-crepe (12½ lb. to M shts) per case	
Napkins, full crepe and embossed (12½ lb. to M shts) per case	
Toilet, bleached (M shts) per case	
Toilet, unbleached (M shts) per case	
Wrappings (kraft, basis 50 lb. and heavier)	per cwt
Standard wrapping	9.25
Butchers, counter rolls	10.25
Standard bagging, mill rolls	
Shipping sack, mill rolls	
Gumming, mill rolls	
Asphalting, mill rolls	
Envelope, mill rolls	

Names in the News . . .

(Continued from page 342)

Robert E. March has been named manager of the Scott Paper Co. pulp mill at Empire, Ore.

Randall G. Satterwhite Jr. has been named assistant superintendent of the paper sensitizing division of Eastman Kodak Co. in Rochester, N. Y. He was formerly supervisor of administrative planning and control.

E. S. McLean has been named treasurer of Fraser Companies Ltd. and its subsidiaries (Fraser Paper Ltd. and Restigouche Co. Ltd.) to succeed H. H. Henderson, who has retired. McLean was formerly assistant treasurer. In another appointment, **H. M. Logan** succeeds McLean as assistant treasurer. Logan was previously general auditor.

Vernon E. Johnson, president of Canadian International Paper Co., has received the honorary degree of Doctor of Laws from Lehigh University in Bethlehem, Pa. He was a member of the Lehigh Class of 1920.

Clyde B. Morgan, president of Rayonier Inc., has been elected a director of Northwest Airlines Inc.

Allied Personalities

George E. Reynolds has joined Valley Iron Works Co. as chief engineer. Reynolds was previously with Beloit Iron Works and was also associated with Rice Barton Corp.

Howard F. Harris has been appointed director of public relations for Corn Products Refining Co. Harris was formerly public information director of Grocery Manufacturers of America Inc.

Eastwood-Nealley Corp. has announced the appointment of **Joseph J. Parker** as its representative in the Midwestern territory. Parker will succeed **Frank Eilers,** who has been named consultant for the company.

Albany Felt Co. has appointed three district managers. They are: **Joseph E. Tanner, Raymond P. Dustrude** and **Clifford E. Van Buren.**

J. Walter Juckett has been elected president and general manager of Sandy Hill Iron & Brass Works. Juckett will succeed his father, the late Frank A. Juckett. The company has also made the following appointments: **J. Wesley Joslyn,** first vice president; **Loren O. Gallup,** vice president and comptroller; **L. G. Brockelsby,** secretary and treasurer; **Allen A. Lowe,** assistant vice president, and **Millard F. Hayes Jr.,** manager, international engineering division.

John E. Benedict has joined John W. Bolton & Sons Inc. and has been appointed to the company's sales staff. Benedict was formerly associated with Revere Copper & Brass Inc.

Hercules Powder Co. has made the following managerial sales assignments: **J. Huston McClane,** assistant sales manager to the home office; **Daniel D. Cameron,** district sales manager in New Orleans.

Clive C. Earle has become sales manager for Joseph T. Ryerson & Son Inc.

R. E. Small has been appointed vice president of sales for Paper Converting Machine Co. Small had been sales manager previous to this appointment.

S. G. Paddock has been named executive vice president of Burgess-Manning Co. He formerly served as vice president of the company's Industrial Silencer Div. The company has also elected the following: **F. P. Hutchinson** as director; **E. D. Woisard,** treasurer and assistant secretary, and **A. W. Dreffein** to the office of secretary.

David M. Shapleigh has been appointed sales engineer for Bauer Bros. Co. Shapleigh will work in the company's New England office.

David R. Dalzell has been promoted to chief engineer of E. D. Jones & Sons Co. Dalzell has been product engineer in charge of beating and refining control.

Richard M. Lawrence has been named research project analyst for A. E. Staley Mfg. Co. Lawrence was formerly with Wyandotte Chemicals Co.

J. Y. McCandless, a former sales representative, has been named manager of the Syracuse, N. Y. district sales office of the Tubular Products Div. of Babcock & Wilcox Co.

Necrology . . .

Devere Dierks

Devere Dierks, 65, Kansas City, Mo. lumber executive, died in May. He was executive vice president of Dierks Forests Inc., which has large timber properties in Arkansas and Oklahoma.

Dierks was also vice president of three subsidiaries, including Dierks Paper Co., which now has under construtions at Pine Bluff, Ark., a sulfate pulp, paper and board mill.

Irving W. Reynolds

Irving W. Reynolds, 77, vice president of the Foxboro Co., died in June at his Foxboro, Mass. home.

Reynolds joined the staff of the industrial instrument firm at the time of its founding in 1908. He specialized in the production of precision instruments and as factory manager perfected techniques in the manufacture of process instrumentation.

Frederick R. Haddock, chief engineer for Roberts Filter Mfg. Co. of Darby, Pa., died in May at the age of 64. He joined the firm in 1910 as a junior draftsman and was named chief engineer more than 30 years ago.

Harry T. Paterson, 46, operational manager of the Harbor Island and Kure Beach, N. C. test stations of International Nickel Co. Inc., died unexpectedly in May at his Wilmington home. He had been with the firm since 1946, having previously been associated with Ethyl-Dow Chemical Co.

William Townsend White, 79, chairman of the board of both Union Mills Paper Mfg. Co. and Universal Paper Bag Co. in New Hope, Pa., died in May after a long illness. He had served as president of the two firms until 1939, when he was succeeded in that position by his son, Ferdinand R. White.

R. F. Dunger of Appleton, Wis., secretary-treasurer of Combined Locks Paper Co. and treasurer of D. M. Bare Paper Co., died in May.

C. A. Brattstrom, a vice president of Sun Chemical Corp. of Long Island City, N. Y., died June 6 at his home in Port Chester after a prolonged illness. He was 58.

PUT ACTION IN YOUR SAFETY PROGRAM

Add a touch of showmanship to your safety program. Films let you tell your training story with the dramatic impact of pictures . . . action . . . sound. You can cut your safety training in half, give fewer refresher courses and get better results by using training films.

Here are three film sets that will help you arouse and keep alive interest in your safety program. And there is no better way to teach foremen how to be better supervisors.

SPEAKING OF SAFETY

A brand new set of films that will teach your foremen and supervisors the tips they should know about making safety talks, and how to transmit management's ideas and plans. Six 35mm sound slidefilms and leader's manual in an attractive leatherette case.

HUMAN FACTORS IN SAFETY

This is a series of six 35mm sound slidefilms with leader's manual that may be used for an advanced safety course. Each films deals with one aspect of the complex art of handling people. Collectively, the films show how to train workers, how to keep experienced people on their toes and how to win respect, cooperation and loyal support.

SAFETY MANAGEMENT FOR FOREMEN

A set of ten 35mm sound slidefilms—all that is needed for a course in safety fundamentals. The films explain how to organize a safety program, what part the foreman plays in the program and how safety increases production. They also discuss specific safety activities, such as machine guarding, safety inspections, the first aid program, etc. Complete with leader's manual in an attractive leatherette case.

Write for complete information and details to the

NATIONAL SAFETY COUNCIL

425 North Michigan Ave., Chicago 11, Illinois

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PAPER INDUSTRY

Whither?

. . . in production, processes, new products, markets

Bamboo—a promising source of paper fiber

Results obtained at the Herty Foundation in Savannah, Ga., indicate that bamboo promises to become an important source of cellulose fiber for papermaking. The advantages claimed for bamboo are: (1) a smaller consumption of chemicals required in the cooking process; (2) easier pulp bleaching; (3) an annual harvest of bamboo after a 5-10 year period of bringing the growth to maturity, and (4) mechanical harvesting to an extent of almost 100 per cent.

The Barbour Lathrop Plant Introduction Garden, located 13 miles south of Savannah and operated by the Department of Agriculture, has some 182 types of bamboo ranging from the low-growing varieties to one that grows 80-100 ft. high.

Multiple packaging —a new merchandising method

Container Corp. of America has developed a three-can carton as an aid to selling the 42,000,000 cases of corn canned in 1956. The carton offers recipes which, together with the container's mass display effect, stimulate interest and sales. It is believed that the next five years will firmly establish multiple packaging practices for all canned products.

The "man in the package"

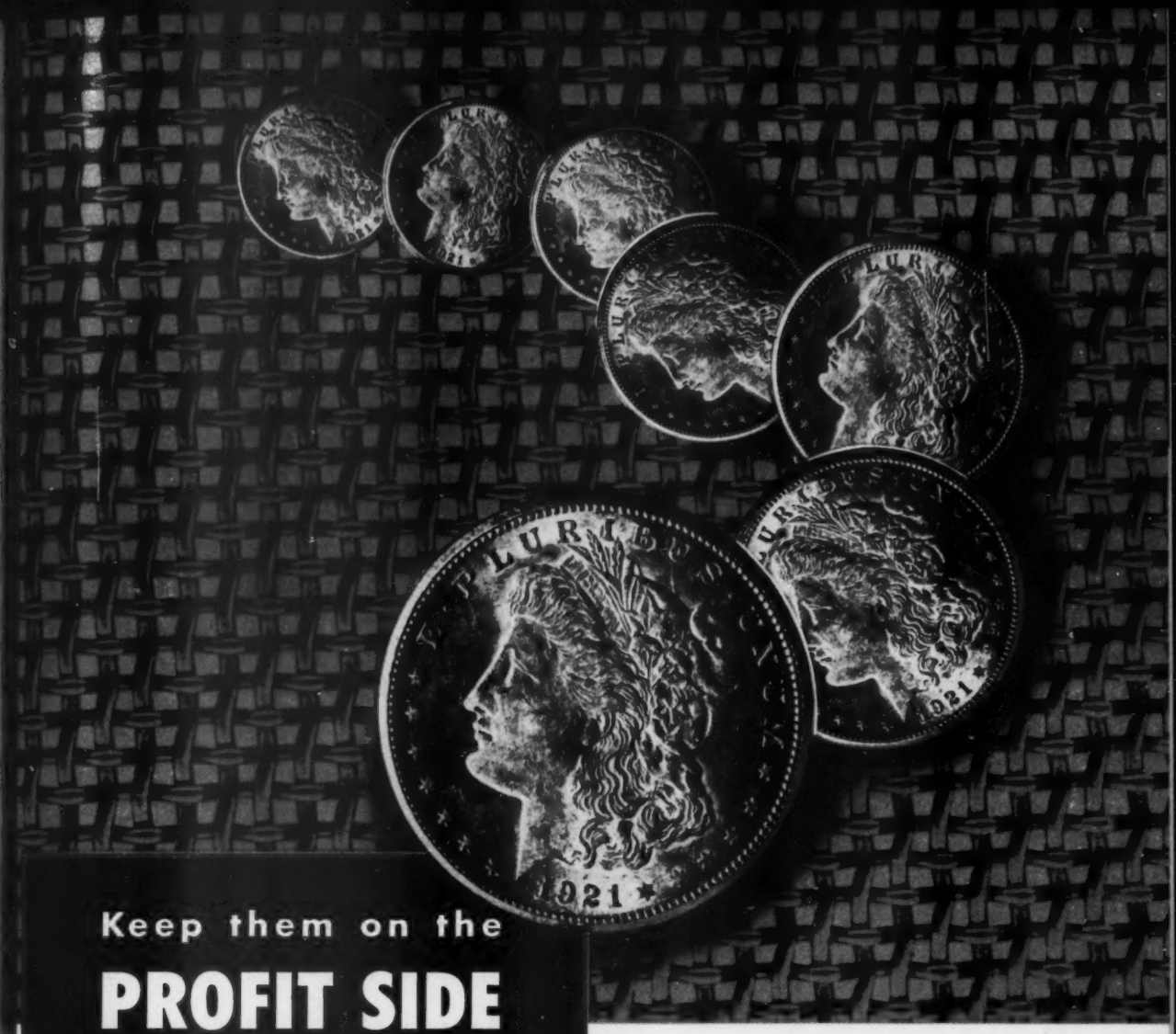
The package that comes to life upon contact with the consumer has a "reaching out" quality that is incorporated in its design, creates just enough design tension to invite uninterrupted inspection by the consumer and disappears as a personality to leave the floor to the product inside. The package must radiate perpetual youth and never permit itself to become old or tired.

Swelling of fibers improves efficiency of beating process

Using aqueous ethylenediamine, it has been shown that the efficiency of the beating process can be improved by the addition of a swelling agent to the beater. However, the effect varies with long- and short-fibered pulps, the improvement being more marked with long-fibered pulps. The short-fibered pulp seems to be more susceptible to damage when in the swollen state. The use of a very powerful swelling agent, however, must be avoided, since it is detrimental to the strength of paper made from either long- or short-fibered pulps.

The cost of accidents

It has been estimated that for every dollar spent on the medical treatment of an accident injury, the industrial plant suffers additional losses amounting to $4.00, which are indirectly attributed to the accident.



Keep them on the

PROFIT SIDE

of the wire . . .

***A significant increase in percentage of filler retained*—that's the DOLLAR-SAVING experience of more and more mills as a direct result of using a DARLING glue solution as a wet end additive.**

We'd like to work with you in determining what can be accomplished in your mill. The entire cost is on us, so you've nothing to lose—everything to gain. You can make arrangements through your DARLING sales representative. Or write or call us direct.

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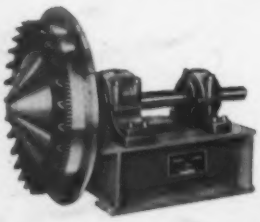
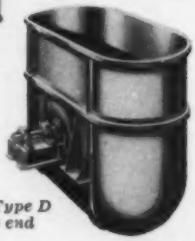


Model C "Slush-Maker" pulping unit

Around the world, the

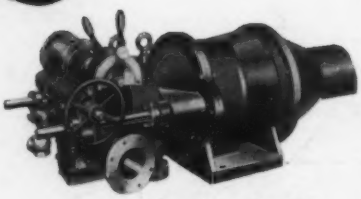


"Slush-Maker" Type D continuous dry end

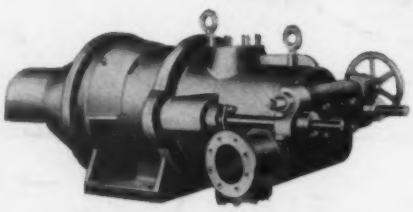
name "Morden"

"Slush-Maker" Type A batch or continuous

stands for specialists

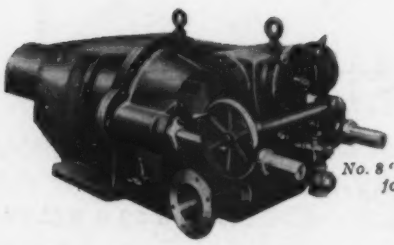


No. 6 "Stock-Maker" for beating



"Stuff-Maker" for jordaning

in quality and in service.



No. 8 "Stock-Maker" for beating

Send for your copy of the Morden Catalog, and ask for an in-the-mill discussion of your stock preparation requirements.

MORDEN MACHINES COMPANY

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